TRANSPORTATION PROBLEMS OF EXPANDING WESTERN AGRICULTURE

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AGRICULTURE - WASHINGTON

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it was possible for the Department to work out a research project that would contribute greatly to a better understanding of the transportation problems of the West and of the manner in which they affect an expanding western agriculture.

Western farmers have always recognized that their success or failure depends to a great degree on an adequate transportation system. While rates have been a major consideration to many farmers, there has been a substantial group who believe that an adequate transportation system means more than low rates. It means adequate care in handling, to protect quality, as well as having available railroad cars or motor trucks of the right type, at the right place, and at the right time for the movement of farm products. The past experiences of western farmers have caused them to center their attention on ways to assure adequate rail, truck, and water transportation, as well as a suitable system of highways for the farming areas. In this study, special attention has been focused on the transportation requirements of the tremendous farming areas that will come into production in the Columbia River Basin in Washington and the Central Valley of California, as well as a number of other irrigation projects that are now being developed in the West.

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Section I

INTRODUCTION

The seven states of the Pacific Slope[1/] are the most rapidly growing economic region of the United States. Since the original westward migration began more than a century ago into the Oregon, Utah, and California territories in the 1840's, the flood of migrants has continued with little abatement. Westward migration slowed down in the depression years, but it was accelerated again by the economic stimulation of World War II. The population increased by nearly a half in the decade from 1940 to 1950. The pace of migration has slackened only a little in the last three years. The Pacific Slope has been growing increasingly more important in the nation in numbers of people and in economic achievements. The prospect is that this trend will continue.

Agriculture on the Pacific Slope has been based to a large degree on range land and irrigation. Irrigation early became the backbone of western agriculture; with the passing of time, irrigated acreage has been extended phenomenally by private and public effort. Early development, largely through private initiative, was based mostly upon ground water resources, and this has continued to be the mainstay of irrigation in the West. Irrigation development utilizing surface water has been achieving greater significance since the Bureau of Reclamation was established in 1902. There are indications that public investment in irrigation will increase as ground water supplies decline and as less costly irrigation projects are completed.

These prospects raise key problems concerning the location of future production, consumption, and marketing of agricultural commodities, with consequent potential transportation problems.

A. Objectives of the Study

The principal objectives of the project were: (1) to discuss and analyze the nature of the transportation problems that may arise from the creation of new agricultural areas; (2) to study the extent to which transportation facilities and charges are significant forces affecting the location of agricultural areas and the processing and marketing of farm products; and (3) to define transportation problems of significance to agriculture on the Pacific Slope.

B. Scope of the Project

The approach of this study is exploratory rather than definitive. The broad subject matter of the project necessitated work on

1/ Arizona, California, Idaho, Nevada, Oregon, Utah, and Washington.

many aspects of transportation and marketing problems related to expanding western agriculture. As a result, intensive study was not possible on all phases of the project.

In referring to transportation problems, it is essential to view the function of transportation in perspective. Transportation "problems," except in the way that they affect carrier operations, do not arise out of the function of transportation as such. Transportation problems generally arise out of economic processes such as marketing, distribution, and production, in which transportation plays a significant role. For research on transportation to be productive, it is necessary to consider transportation problems in relation to these essential functions.

Within a region as large as the seven western states, there is much variation in the nature and effects of transportation and marketing problems among agricultural areas. Even within states, there are extensive differences in the problems involved. Transportation problems are related to the marketing and distribution of specific commodities which must be moved to and from specific points, and it is difficult and sometimes dangerous to draw generalizations with regard to agricultural transportation problems, except on a broad basis. Although the types of problems may be common to all areas within the region, the effect and impact may differ substantially. In addition, transportation problems are usually peculiar to specific commodities, with wide variance in the methods of transporting, handling, storing, and marketing.

For these reasons, the present and potential transportation and marketing problems of a specific area, the Columbia Basin, are discussed, with detailed consideration given to commodities that will constitute an important and diversified segment of Columbia Basin agriculture. The commodities are milk and dairy products, livestock and meat products, potatoes, wheat, and frozen sweet corn. These commodities are also representative of very important western agricultural industries as well as of major significance to the Columbia Basin.

In the consideration of specific area and commodity transportation problems, it was necessary to relate them to the Pacific Northwest and to the Pacific Slope as a whole. Thus, the discussion of the problems of the Columbia Basin touches upon wider areas where pertinent.

In addition to the specific area and commodity approach, the project was concerned with broad transportation problems of general interest to agriculture within the Pacific Slope. These problems are discussed because of their significance to western agriculture.

For the purpose of this study, transportation "problems" are considered to be those of the user of the transportation service.

Of course, the problems of the carrier are of concern to the users, since they may influence the cost and the adequacy of the service. The efficiency of the carriers and the fundamental economic factors influencing adequacy and cost of transportation in the final analysis are the problem of the user. But, these more fundamental factors are not be be confounded with the detailed operating problems of the carriers; the latter have been considered here only if they are of major significance to the user.

C. Method of Approach

In Phase I, an analysis was made to locate areas where agriculture has shown significant expansion over the past 25 years. The analysis revealed that during the last two decades there were considerable geographical shifts and a substantial intensification in the production of certain farm products. Since the analysis showed that expansion was generally associated with irrigation development, information pertaining to irrigation was developed, from published sources and from the regional offices of the Bureau of Reclamation, bearing on size of projects, scheduled rates of development, and prospective use of land in seven major irrigation projects. From this analysis, the Columbia Basin was chosen for more detailed study.

In Phase II, an analysis was made of the pattern of movement of the commodities selected for study. This material on present traffic patterns was developed for use as background data in determining the type of transportation problems that might face producers and shippers in the Columbia Basin area, as well as for the interest of those now engaged in agricultural production on the Pacific Slope.

Supply-consumption analyses were made to determine fundamental economic forces underlying the transportation of commodities among areas. Detailed analyses were confined to milk products and livestock and meats, which are in a deficit position on the Pacific Slope.

During the study, several field trips were made to the Columbia Basin Project and the Northwest for a firsthand study of the present status and plans for development. Attention was directed toward land use, marketing and transportation practices, and facilities, and the problems of adjustment that may be associated with the handling and movement of farm products in the course of the economic development of the Basin. Field work was also done in the San Francisco Bay Area, mostly among first receivers of commodities originating in the Columbia Basin and the Northwest. Field work among handlers emphasized channels of movement, problems that arise from competition among types of transport, and problems generally affecting the competitive situation of the Basin as a producing area. Specific problems of transporting selected typical commodities were developed in this way.

Rate data were developed in cooperation with rail and truck carriers, tariff bureaus and others. Rate data were developed principally by Bishop & Bahler, Traffic Consultants, San Francisco.

A study of the literature supplemented by field interviews provided the basis for the examination of transportation problems of more general interest to western agriculture. These problems were discussed with representatives of transportation carriers, individual shippers, commodity trade associations, and well informed individuals at universities and other agencies.

D. Acknowledgements

The guidance of a Steering Committee of the Western Agricultural Economics Research Council is hereby acknowledged, particularly in regard to the approach to this study. Members of the Steering Committee are:

Wendell Calhoun, Secretary, Western Agricultural Economics Research Council
Raymond G. Bressler, Jr., Director, Giannini Foundation, University of California
D. Barton DeLoach, Chief, Market Organization and Costs Branch, Agricultural Marketing Service, United States Department of Agriculture
William E. Folz, Head, Department of Agricultural Economics, University of Idaho
A. H. Harrington, Professor, Department of Agricultural Economics, Washington State College
R. E. Seltzer, Professor, Department of Agricultural Economics, Arizona State College

Many individuals and firms have given the project staff members material assistance in the preparation of this report. Sincere appreciation is expressed for their help. Members of firms and agencies contacted in person or by mail responded generously.

The assistance of the Bureau of Reclamation is gratefully acknowledged. The Ephrata and Boise offices of the Bureau generously made available the results of their work pertaining to the future development of the Columbia River Basin. The Sacramento and other regional offices of the Bureau were of direct help in providing data and information in connection with field visits or correspondence.

This study has drawn heavily upon the knowledge and studies of staff members of the Washington, Idaho, Oregon, and California agricultural experiment stations and of the Bureau of Agricultural Economics of the United States Department of Agriculture.

E. Staff

The project was carried out in the Economics Research Division under the administrative direction of Charles L. Hamman. William Bredo served as Project Leader and was assisted by Robert O. Shreve, Morgan Sibbett, and Roberta A. Remak.

Section II

SUMMARY

A. Expanding Population and Markets

Over the last century, the seven states of the Pacific Slope region have grown phenomenally in population and have recorded impressive economic achievements. The Pacific Slope has had an increasing share of the nation's population. California has evidenced more rapid growth than other states in the region. It is the largest western market for agricultural products and will continue to demand an increasing portion of the nation's food supply.

B. Expanding Agriculture and Trends in Land Utilization

Agriculture has played a major part in the economic development of the region, and the region has been an important and often an only source of farm products demanded by the consumers of the nation.

Western agriculture is characterized by extremes in the intensity of land utilization. According to the 1950 Census, grazing land outside of farms occupied 209 million acres, and uncultivated pasture land in farms accounted for another 105 million acres. The intensive, highly productive agriculture of the Pacific Slope was based on 10 million acres of irrigated cropland and a little over 2 million acres of irrigated pasture. Less than 9 million acres were in unirrigated cropland.

Irrigation developments will bring about further expansion of agriculture on the Pacific Slope. Historically, the bulk of irrigation development has been achieved by private initiative. The large scale projects of the Bureau of Reclamation are becoming increasingly important. The program of the Bureau of Reclamation is subject to Congressional appropriations; yet it is more predictable than the extent of future private irrigation development. The program of the Bureau is so large in relation to total prospective development that it may be considered indicative of a minimum expansion of irrigation in the years ahead.

In the course of the presently planned seven-year program of the Bureau, a large proportion of additional acreage will be developed in two mammoth projects, comprising 391,500 acres of full irrigation in the Columbia River Basin Project in the state of Washington, and 286,100 acres of full irrigation in the Central Valley Project in the state of California.

C. Trends in Transportation

Volume of rail and truck freight carried in the Pacific Slope States has increased substantially over the prewar levels. The development and great growth in motor truck transportation over the past three decades has been an outstanding factor in western transportation which has significantly influenced agricultural transportation.

D. Supply--Consumption Relations

The Pacific Slope States are in a deficit supply position with relation to consumer requirements for meats, with the exception of mutton and lamb. It is estimated that the Pacific Slope States were short of regionally-produced meat products in the amount of 1.1 million pounds carcass weight during the period 1947-52.

As a result of the rapid population growth of the Pacific Slope, consumption of meats has been rising faster than meat production. If present regional and national trends in the livestock and human population continue, the deficit may reach 2.2 billion pounds by 1963, and 3.8 billion pounds by 1975. The bulk of the pork requirements are shipped into the region, and a lesser proportion of beef and veal requirements are shipped in. Projections of the regional supply-consumption balance indicate that inshipments promise to become increasingly more important in relation to regional output. Present production of lamb and mutton is surplus, and a small proportion is shipped to eastern markets. However, a shift toward a substantial deficit position is in prospect, which will be reached prior to 1963.

Continued growth of the regional deficit for meats will result in a substantial extension of the region's meat supply areas farther and farther east. California is largely responsible for the growing deficit position of the region in the production of meats.

The supply of milk produced on the Pacific Slope is insufficient to meet regional requirements for all milk products. Butter and cheese are the major dairy products shipped in from the Midwest. It is estimated that the region was short by 1.3 billion pounds, milk equivalent, in 1952. In the future, if historical trends persist, the regional milk deficit may double to 2.6 billion pounds by 1963 and may reach 3.9 billion pounds by 1975.

At the present time there is an imbalance in the production of butter and cheese within the Pacific Slope States. Besides drawing upon the surplus-producing midwestern areas, the California market is also heavily dependent upon the Northwest for these commodities. In the course of the next two decades, while the over-all regional deficit in milk products increases, and the

fluid milksheds expand, the supply of milk products manufactured in the region will decline relatively. The region will become more dependent upon the central states for manufactured milk products, particularly butter and cheese.

The other commodities covered in the study, wheat, potatoes, and sweet corn, are all produced in surplus on the Pacific Slope and must find outside markets. Wheat production is concentrated in the Northwest, and in the postwar period a large proportion has moved to offshore and foreign markets, and most of the balance has moved to California. More than a third of the potatoes marketed by farmers in the United States originated in California and the Northwest (mostly in Idaho) in 1952. The Pacific Slope surplus represented a substantial addition to national supplies. An even greater surplus of frozen sweet corn is produced in the West. In 1952, about 21 percent of the national pack of cut frozen corn was produced in Oregon and Washington.

E. Commodity Movement Patterns in the Pacific Slope States

The structure of traffic movement cannot be determined with precision either for the Nation or the region, primarily because statistics on interstate truck movements are unavailable. However, a fairly reliable picture can be put together by utilizing the One Percent Waybill Sample of the Interstate Commerce Commission and the market receipts and unloads statistics of the United States Department of Agriculture.

Butter and cheese are the best indicators of the movement of manufactured milk products. A principal characteristic of the pattern of butter and cheese movements as they affect the Pacific Slope is the large volume shipped into California from relatively long distances. In 1952, about 65 percent of the butter receipts and 55 percent of cheese receipts in the San Francisco and Los Angeles markets originated outside the eleven western states. Idaho supplied a large proportion of the butter and cheese shipped into California from the Pacific Slope region.

A large proportion of the cattle and calves received within the Pacific Slope States in 1952 originated outside of the region. California dominates as the receiver of cattle and calves.

The surplus regional balance for sheep and lambs is attested by the fact that in 1952, 40 percent of the rail shipments originating on the Pacific Slope were terminated outside the region, mostly in the midwestern and eastern markets. A third of the rail shipments of sheep and lambs destined for the Pacific Slope terminated in California, the only state in a deficit supply position.

The major characteristic of the pattern of hog movements is the great percentage shipped into the Pacific Slope from outside

the region. In 1952, only about 3 percent of the 1.9 million head of hogs shipped into California originated on the Pacific Slope and the Mountain States; about 55 percent of the total came from Nebraska alone.

With the increasing deficit of livestock products on the Pacific Slope region, inshipments of fresh and cured meats have grown to substantial proportions.

Potatoes account for a significant volume of agricultural commodities in interregional trade. The western states are an important source of supply of potatoes for the domestic market. The Pacific Slope States in 1952 originated 46 percent of the rail tonnage of potatoes in the nation compared to terminations of about 13 percent in the region. Volume moving into the Pacific Slope States was negligible. The specialized Maine, California, and Idaho potato-growing areas are the major source of potatoes in the nation. Shipments from these states were approximately 45 percent of domestic shipments in the last 15 years.

All but a small proportion of shipments of wheat originating on the Pacific Slope in 1952 was moved to points in the region, principally for export. A high proportion of the wheat and wheat flour tonnage of the Northwest in recent years has been destined for the export market. The Pacific Slope States receive almost no wheat and flour shipments from the eastern part of the United States.

While wheat and flour exports were rising during recent years, shipments from the Northwest to the domestic market underwent a sharp decline. Rail shipments dropped from 11.6 million to 1.7 million bushels between the 1946 and the 1952 crop years. Intercoastal and coastwise water movements have almost disappeared in recent years.

The picture of type of transportation used is complex and difficult to summarize briefly. Truck and rail competition is largely a function of distance, with truck competition at an advantage in short hauls. The bulk of the interregional movement is carried by the railroads. For most commodities, the advantages of truck transportation tend to disappear for hauls longer than 400 to 600 miles. Continuing improvements in design and performance are lengthening the haul at which trucks can be competitive.

F. The Columbia Basin

One of the aims of the study was to examine the transportation problems of a specific agricultural area. The larger projects of the Bureau of Reclamation were examined with a view to their suitability for a study of transportation problems associated with expanding agricultural areas. The Columbia Basin was selected for study because it provides the best opportunity for study of

transportation problems of a rapidly expanding and potentially diversified agricultural economy.

The Columbia Basin is located in the western portion of the Big Bend of the Columbia River in Grant, Adams, and Franklin counties in the central portion of Washington. It is a semi-desert area with a moderate climate, a long growing season, and mild winters. The area is especially well suited to the production of fruits, vegetables, sugar beets, and potatoes.

The land in the Basin is now used for an extensive agriculture of dry farming and ranching. Production of wheat, cattle, and sheep are the major farm enterprises. Irrigation of the better lands will completely change the economy of the area, by increasing the intensity of agricultural use. There are indications that recent developments have resulted in a considerable population influx.

The basic railroad system of the Columbia Basin is adequate, but additional spur lines and certain handling facilities may be necessary in the course of irrigation development and consequent growth in the transportation load. Although present highway traffic flows indicate that no serious bottlenecks have occurred, future growth of the Basin will require additional state highways. The existing county and farm road network in the Basin is meager, and additional roads will be needed as the Basin develops.

Because of the presence of five rail lines, together with aggressive water carrier companies, the favorable competitive situation in the Basin will tend to bring required transport facilities into the area when needed.

In general, facilities in the Basin for handling and processing commodities are meagerly developed at the present time. Considering the problem as a whole they are probably adequate for current levels of production. There are a number of instances, notably in bottling fluid milk, in manufacturing milk, and in freezing sweet corn, where facilities outside the Basin are being used while local volume is being built up. Thus as production increases, there will be a need for a constant adaptation and adjustment of the market organization.

Substantial increases in transportation needs may be anticipated from the projected expansion of irrigation agriculture in the Columbia Basin Project. Population in the Basin is expected to rise from 38,500 in 1952 to 123,000 upon mature development of the 600,000-acre program in 1963. Inshipments of freight to meet the needs of the farm population may reach 19,000 carloads per annum in connection with the 600,000-acre program.

The volume of crop marketings should rise substantially. In 1952, 4,321 carloads of crops were marketed. By 1956, under the 600,000-acre program, this total may reach well over 100,000 carloads.

G. Transportation and Marketing Factors Affecting Major Columbia Basin Commodities

The competitive situation of producing areas in the Northwest, and of the Columbia Basin in particular, is basically a question of position with respect to markets. The commodity transportation rate structure is usually a function of mileage, although sometimes the rates from new areas, or areas of low production where the volume of movement has not become large enough to establish commodity rates, are higher than normal.

Projections of the supply of milk and the consumption of fluid milk, cream, and ice cream in the Northwest suggest a large potential expansion of milksheds. This will have an important impact on the Columbia Basin. Milksheds of nearby markets will extend into the Basin, and the central portion of the area promises to become the most important milk manufacturing area in the state of Washington. With rapid shifts being made toward farm tank storage and tank truck assembly, one may expect this area also to adopt these more efficient and sanitary handling methods.

The butter and cheese manufactured in the Northwest are marketed principally in California. In addition, the California markets require year-round inshipments from the Midwest. The specialized Tillamook cheese area has a substantial competitive rail freight advantage over other Northwest areas on shipments of cheese to California. In contrast, Nampa, Idaho, has a corresponding truck freight advantage in California. Nampa also has a lower freight rate on butter. The present rail rates from Columbia Basin points to California are considerably higher than those of adjacent producing areas. On the other hand, the Basin is favorably located with respect to the large markets of the Pacific Northwest.

As far as livestock and meats are concerned, the situation is quite different. Washington is a deficit producer of beef and pork and has a small surplus of mutton. Oregon and Idaho are surplus producers of all meat products except pork. Surplus cattle and sheep from adjacent areas in neighboring states move to the Spokane and Seattle markets. Thus, the Columbia Basin would have an advantage in nearby markets through the development of a livestock feeder industry based on the in-transit rail stop-over privilege. A local hog industry would seem to be favored by the heavy dependence of the Pacific Slope upon midwestern sources of supply. On the basis of experience in the Yakima area, there appear to be opportunities for an important livestock industry in the Columbia Basin. Nearly the entire feeder industry of the state at present is located in the Yakima area. Small slaughtering facilities now exist in the Basin, and most dressed meats required are shipped in. Feeder stock from ranges in Montana and Idaho may be expected to move into the Basin on an in-transit basis on the way to the Seattle and Spokane markets. A limited packing industry may also develop eventually. It is not expected that the developments in the Columbia Basin will tip the scales to shift the state to a surplus supply condition.

Opportunities appear to be very favorable for the development of the potato industry in the Columbia Basin. It is estimated that the importance of the Northwest as a supply area for the national market will increase. In a decade the surplus of the area may double. Washington surplus may increase from 4.5 to 16.6 million bushels, an expansion that may be large enough to halt or reduce considerably the present seasonal flow of California potatoes into the state. On the other hand, the quantity to be disposed of in eastern markets during the heavy marketing season will increase. This will pose a marketing problem which can only be answered by lower prices to the growers in the Columbia Basin than in the Idaho areas, because of the more favorable freight rates and present consumer preference for Idaho potatoes.

Prior to the postwar period, northwestern white wheat enjoyed large market in the East and Southeast. The large overseas market, and freight rate and intercoastal rate increases to the East, have caused shipments to the eastern wheat and wheat flour markets to decline sharply. Little wheat is moved coastwise to California, owing to the weak competitive position of water traffic. Development of deep draft barge service on the Columbia River, and eventual extension of service from Pasco to Lewiston, Idaho, and Wenatchee, Washington, will tap the whole white wheat area and the Columbia Basin for wheat and other bulky commodities, providing competitive transportation alternatives. Wheat is not expected to become a much more important crop in the Columbia Basin in the future than it has been on dry land farming in the past.

The major problem now looming up for wheat is the decline in foreign and offshore markets. In the years ahead a permanent adjustment will need to be based upon a lower level of production and the re-establishment of the region in the national market. This may come about not only by a lower relative price for wheat, but a wheat price in the Northwest lower in relation to national levels.

Frozen fruits and vegetables are shipped from the Pacific Northwest into many states outside the Pacific Slope. The level of transcontinental freight rates, therefore, is an important factor in the market orientation for frozen fruits and vegetables.

An important problem in the transportation and marketing of frozen fruits and vegetables is the extreme diversity in the size, weight, and shape of containers and shipping cases.

The major problem in the transportation of frozen foods is the adequacy and the availability of properly refrigerated railroad cars, trucks, warehouses, and handling facilities.

H. Transportation Problems of General Interest to Western Agriculture

One objective of the research leading to this report was to identify and outline important transportation problems of western

agriculture. Agriculture's interest in transportation falls generally into three categories: (1) the level of freight rates and freight rate relationships among competitive producing areas and between them and the economy generally; (2) the adequacy of service as shown in the availability of required facilities and in the improvement of services offered; and (3) general regulating policies which have a basic influence on agricultural transportation.

Transportation costs are of primary interest to western agriculture. Western growers, particularly of basic commodities surplus to the area, have been deeply concerned with increases in transportation costs over the past decade.

Changes in freight rates for agricultural commodities in recent years have had an influence on markets available to western products. There have been a succession of percentage rate increases on a general over-all basis. These percentage increases have been softened materially by maximum allowable rates or "hold-downs" which are very much lower than the flat percentage would come to. However, such rate increases have been of great concern to western growers because percentage increases have the greatest impact on areas farthest from the market. As distance increases, percentage rate increases tend to widen cost differentials and change competitive relationships among producing areas.

Improvement in transportation efficiency is one method of increasing carrier revenue so that rates can be reduced or the effects of increased costs minimized. Although some progress has been made by the carriers to improve their efficiency, much remains to be done. Improvements in efficiency are not limited to the carriers, and attention should be given to the improvement of operations "incidental" to the transportation haul itself.

The exemption of agricultural commodities from rate regulations when transported by motor carriers is a matter of vital interest to western agriculture. The scope of the exemption apparently has been broadened and there has been a large growth in exempt traffic. There have been attempts in recent years to eliminate the exemption, as yet unsuccessful.

One of the fundamental problems surrounding sound decisions on this issue is the general lack of data on exempt traffic. Little factual information is available on the magnitude or extent of exempt trucking operations, or on their economic effect on other transportation services and upon agriculture.

The application of uniform class rates to Mountain-Pacific and transcontinental rate territories will bring about changes in the over-all rate structure which are of direct concern to western agriculture. Any class rate charges which decrease carrier revenue might tend to bring pressure for increased commodity rates, including those for important agricultural products. Also, the introduction of rates strictly tied to distance will bring about changes in competitive relationships among commercial centers and among individual industrial plants.

These changes will have their impact upon agriculture through its relationships to other segments of the economy.

Transportation barriers among the states remain one of the major transportation problems of western agriculture. Although the existence of these barriers has been long recognized, and much research effort has been directed toward identifying and listing them, much remains to be done in measuring and evaluating the economic effects of such barriers on western agriculture.

The principal barriers can be classified as falling into the following categories.

1. Limitations on physical characteristics of vehicles and loads.

2. Variations in the amount and type of taxation and fees.

3. Operating restrictions on truckers.

4. Container restrictions.

5. Restrictions on the movement of specific commodities.

One of the transportation problems facing the West today is the question of finding sufficient revenues for the construction, maintenance, and improvement of highways and roads. The costs involved in improving the deficiencies in western highway and road systems are staggering. Great controversy rages over who should pay what share of the costs of highway construction and maintenance.

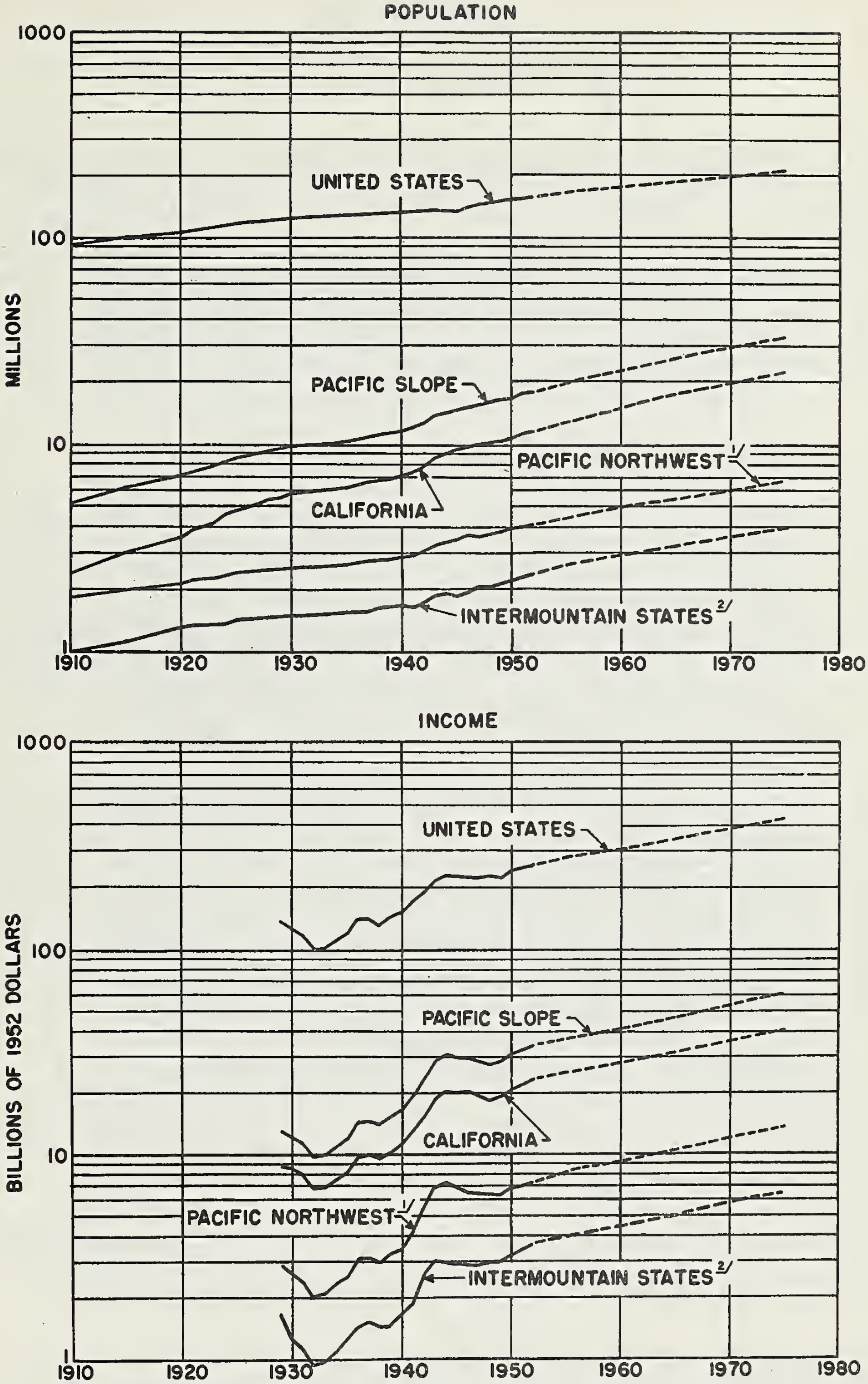
Other important transportation problems of general interest are:

1. The economic effects of possible repeal of the long-and-short-haul clause of the Interstate Commerce Act.

2. The economic effects of diversion of traffic from rail to motor carriers.

3. The impact on agriculture in the Pacific Northwest of improved inland waterway transportation.

4. The adequacy of transportation and distribution facilities for frozen foods.



1/ WASHINGTON, OREGON, IDAHO

2/ ARIZONA, UTAH, AND NEVADA

SOURCE: APPENDIX TABLE I

Figure I

ESTIMATED POPULATION AND TOTAL INCOME OF THE UNITED STATES, PACIFIC SLOPE, PACIFIC NORTHWEST STATES, AND CALIFORNIA, 1910 — 1980

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Section III

THE EXPANDING WEST AND WESTERN AGRICULTURE

This project has been concerned with expanding western agriculture and the transportation problems related to such expansion. The expansion of western agriculture has been part of the rapid expansion of the total western economy. The transportation requirements of agriculture are related to those of other segments of the economy, since the facilities are jointly used. In this section of the report, the growth of the total western economy is discussed as well as western agricultural expansion, together with an outline of trends in transportation facilities and services.

A. Trends in Population and Income

During the last century, the Pacific Slope States have grown at a phenomenal rate in population and in economic stature. (See Figure 1.) In 1952, the population of the Pacific Slope States was 11.4 percent of total United States population. It is estimated that the region may claim about 15 percent of the nation's population in the period 1970-75. The population of the United States is expected to rise from 156 million in 1952 to 214 million in 1975. Over the same period the Pacific Slope population may rise from 17.8 million to 33 million.

In terms of population and income, California has been of predominant importance among the Pacific Slope States. Its population has grown more rapidly than that of any other state in the region, reaching 63.3 percent of the population of the whole region by 1952. By 1975 it is expected to reach 67.7 percent. This is significant in any analysis of regional problems concerned with the supply, consumption, and movement of agricultural products, because California is the largest western market for agricultural products.

Consistent with a rapidly developing new economy, wage rates and per capita income in the Pacific Slope States have always exceeded national levels. Income payments to individuals provide a means of assessing income trends in the region and comparing them with the United States total.

In 1929, the Pacific Slope share of total national income[1/] was 9.4 percent. Although national income had fallen drastically by 1933, the Pacific Slope share had risen to 9.7 percent.

In the postwar period the Pacific Slope's proportionate share of the national income declined slightly, but it continued at a

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1/ As measured by income payments to individuals.

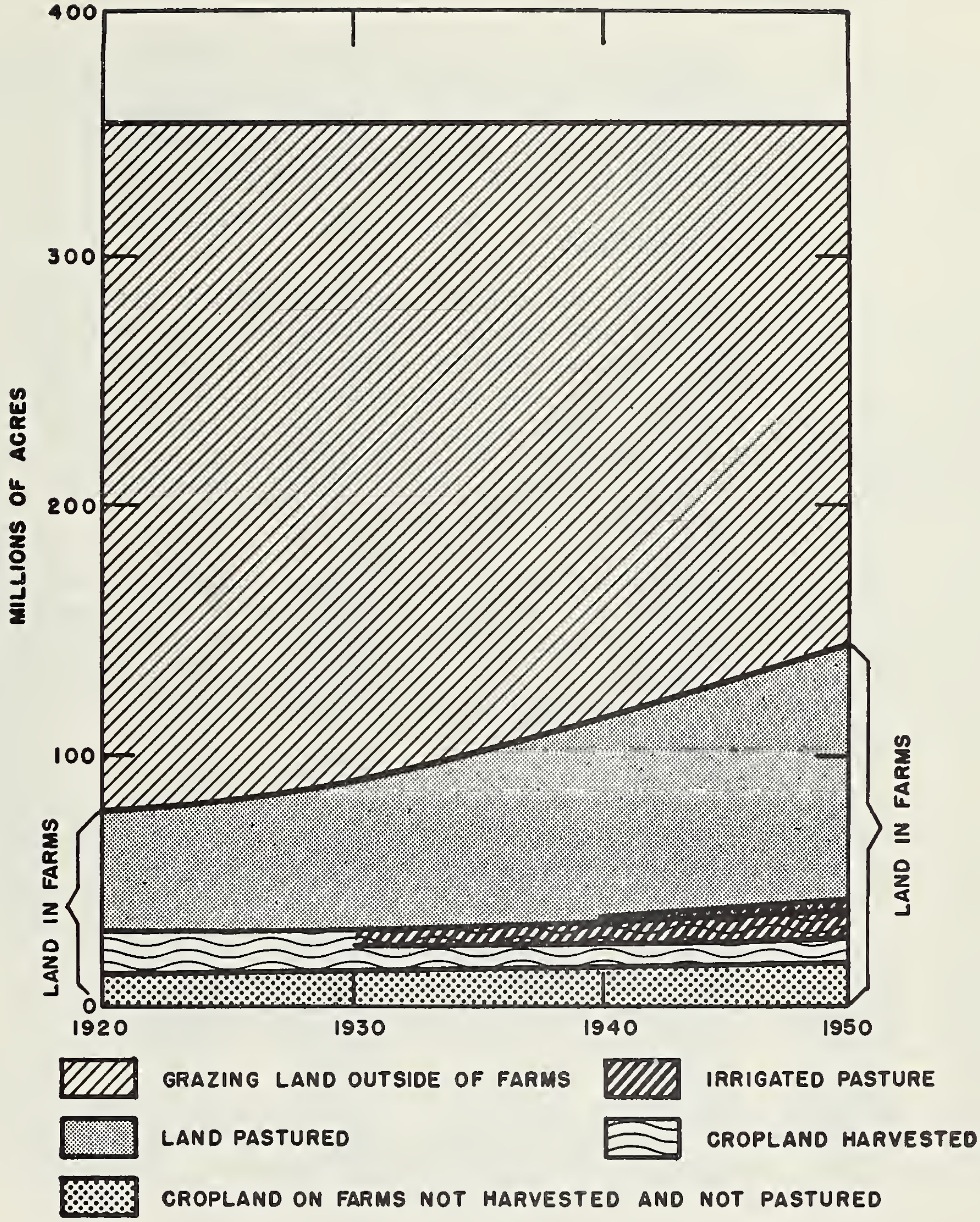

Figure 2

USE OF LAND SUITABLE FOR FARMING AND GRAZING
ON THE PACIFIC SLOPE, 1920 — 1950

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level far above that of the thirties. In 1952 the regional share of income had risen to 13.3 percent compared with its share of national population of 11.4 percent. Projections of income trends by Stanford Research Institute indicate a continued gain over the next two decades, with the Pacific Slope share of national income rising to 14.2 percent by 1975 (see Appendix Table A-1).

In view of the probability that population and income on the Pacific Slope will continue to expand more rapidly than in the nation, the prospects are that the Pacific Slope States will, therefore, continue to demand an ever-increasing proportion of the supply of food and other agricultural products in the United States.

B. <u>Trends in Land Utilization</u>

The striking feature of the entire land utilization picture in the United States over the last thirty years has been the decline in grazing land outside of farms and the extension of pasture land in farms. On the Pacific Slope the land in farms doubled in area from 1920 to 1950; for the nation as a whole, it increased about one-sixth in that time, from about 970 million acres to a total of 1,159 million acres by 1950. About a third of this increase in land in farms occurred on the Pacific Slope.

For the United States as a whole, cropland acreage declined from 362 million in 1920 to 321 million in 1940. It rose again to 345 million by 1950, while cropland on the Pacific Slope increased about 25 percent, or 4.5 million acres, from 1920 to 1950. Most of the increase in Pacific Slope cropland is attributable to the extension of irrigation.

Of the 453 million acres of land in the Pacific Slope, 99 million acres were unsuitable for farming or grazing. Of the remaining 354 million acres (see Figure 2), in 1950, grazing land outside of farms occupied 209 million acres, and land in farms occupied 145 million acres. More than two-thirds of the land in farms was in uncultivated pasture (107 million acres). Cultivated cropland comprised 21.6 million acres, of which 10.4 million acres were irrigated. Another 2.6 million acres of pasture were irrigated. Approximately half of the irrigated land in the nation was located on the Pacific Slope.

In the late 1840's there were a few small irrigation projects in the Utah deserts. A century later, in 1950, 13 million acres of land were under irrigation in the Pacific Slope States. Without irrigation, much of the land of the region is arid desert, or supports only extensive grain farming and livestock grazing. In the period 1890-1920, irrigated acreage was added at a rapid pace in the Pacific Slope States. In these thirty years, 8.6 million acres of irrigated land were added, compared to the addition of 2 million acres in the next twenty years, and 1 million acres during the last decade.

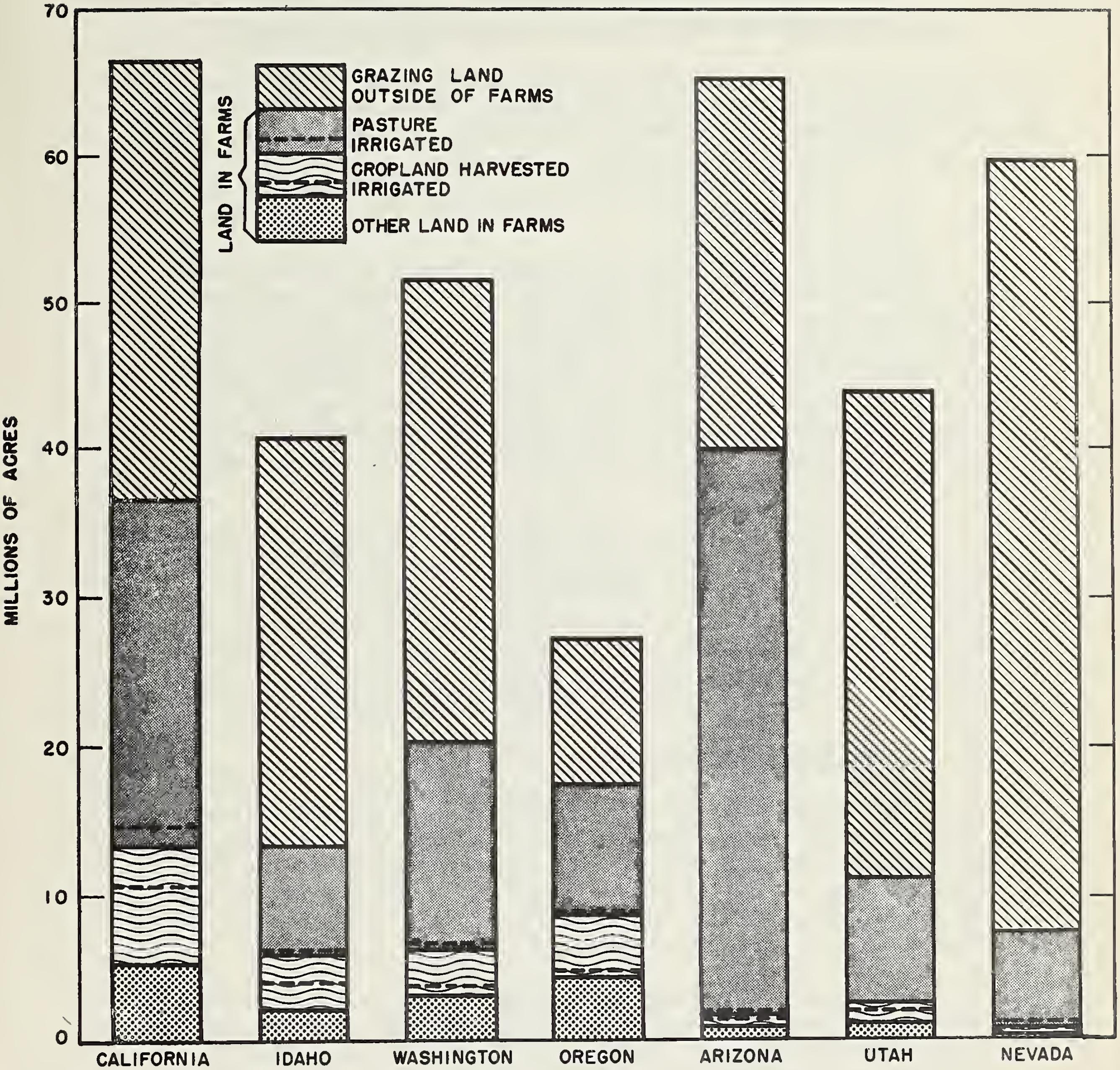

Figure 3

LAND USE OF THE PACIFIC SLOPE STATES, 1950

B-657-4

In 1949, one-third of the irrigable acreage on the Pacific Slope was concentrated in California and Idaho. California alone had about one-fourth of the irrigated land, 6.3 million acres. A number of the states had more than a million acres of irrigated land.

C. Trends in Western Transportation Facilities and Services

Transportation facilities have influenced western development and at the same time have been affected by the nature and rate of economic development in the West. Over the past forty years, significant trends in transportation have occurred.

1. Rail Transportation

As indicated in Table 1 the basic western railway plant, as represented by miles of right-of-way operated, has remained almost constant for many years. In fact, there has been a decline in miles of right-of-way operated since 1920. This, of course, does not mean that the capacity of the railways has declined, because the railroads actually have been able to handle increasing amounts of freight through improvements in operating equipment and operating efficiencies and by double tracking where practical.

This increased volume is illustrated in Table 2. During the postwar period, the volume of rail freight traffic as indicated by ton-miles has been substantially higher than in the prewar period. In fact, the decline from the high marks reached during World War II has been relatively small. However, the rail plant itself has not been expanded in the sense of bringing rail services into areas not previously served.

2. Motor Truck Transportation

The development and great growth in motor truck transportation over the past three decades has been an outstanding trend in western transportation. The truck population in the Pacific Slope States has grown from a registration of 149,600 in 1920 to 1,099,400 in 1951. (See Table 3.) This total has increased rapidly during the past three years.

The amount of freight hauled by trucks in the western states has increased rapidly. Available data on intercity movements over rural roads show that 5.89 billion ton-miles of freight were hauled over rural roads in the eleven western states in 1926 (Table 4). This total has grown rapidly: to 9.64 billion ton-miles in 1940 and to 35.07 billion ton-miles in 1951, and even higher during the last two years.

This great growth in motor truck transportation has brought with it fundamental transportation problems of great interest to agriculture. Some of these lie in the relationship of the

motor carrier to other forms of transportation, the rails and water carriers particularly, as far as basic regulatory policies are concerned. Other problems have arisen in connection with competitive rates and practices among the carriers. Still others have developed over allocating costs of highway maintenance and construction, part of which are incurred because of motor truck operations.

Table 1

RAIL MILEAGE OPERATED IN THE PACIFIC SLOPE STATES
Selected Years 1920-1950, as of December 31

		Miles of Right-of-Way Operated 1/	
Year	Calif.	Total 2/ Pacific Slope	Total United States
1920	8,251	27,186	257,993
1925	8,292	27,415	258,631
1930	8,354	27,912	258,684
1934	8,340	27,902	253,274
1938	8,135	27,233	247,073
1946	7,583	26,221	237,699
1950	7,904	26,230	235,471

1/ Data exclude switching and terminal trackage.
2/ Detail may not add to totals because of rounding.

Source: Association of American Railroads, Bureau of Railway Economics, Railway Mileage by States.

Table 2

VOLUME OF RAIL FREIGHT TRAFFIC[1/] IN THE ELEVEN WESTERN STATES
1935-1951
(Millions of Ton-Miles)

Year	West	United States	Percent of United States
1935	32,389	283,637	11.4%
1936	39,749	341,182	11.7
1937	43,054	362,815	11.9
1938	36,456	291,866	12.5
1939	41,463	335,375	12.4
1940	46,582	375,369	12.4
1941	63,746	477,576	13.3
1942	91,913	640,992	14.3
1943	108,298	730,132	14.8
1944	117,663	740,586	15.9
1945	111,655	684,148	16.3
1946	88,833	594,943	14.9
1947	96,508	657,878	14.7
1948	93,976	641,104	14.7
1949	84,924	529,111	16.1
1950	95,025	591,550	16.1
1951	104,223	649,831	16.0

1/ Excludes terminal switching.

Sources: Information on the West from Western Traffic Association, Statistical Bureau.
United States Interstate Commerce Commission, Bureau of Transport Economics and Statistics, Statistics of Railways in the United States, 1951.

Table 3

NUMBER OF PRIVATELY OWNED TRUCKS1/ REGISTERED
IN THE PACIFIC SLOPE STATES
1920-1951
(Annual Registrations in Thousands)

Year	Calif.	Idaho	Wash.	Ore.	Ariz.	Utah	Nev.	Total Pacific Slope	Total2/ United States
1920	93.3	4.2	29.8	11.6	4.3	5.6	0.8	149.6	1,107.6
1921	110.6	4.4	27.7	15.2	4.5	6.9	0.8	170.1	1,281.5
1922	141.8	4.5	31.9	17.5	5.9	7.2	1.8	210.6	1,569.5
1923	155.5	5.2	37.1	20.5	6.6	7.9	2.0	234.8	1,849.1
1924	180.0	7.6	41.6	23.0	7.6	8.9	1.9	270.6	2,176.8
1925	214.7	7.6	47.0	26.5	8.2	10.5	3.1	317.6	2,483.2
1926	216.3	8.4	52.9	29.2	8.5	12.5	4.7	332.5	2,807.4
1927	213.8	10.0	57.9	31.3	8.9	13.2	5.4	340.5	2,969.8
1928	217.4	11.2	57.9	30.2	8.3	14.3	5.6	344.9	3,171.5
1929	214.0	13.7	62.3	32.1	10.7	17.0	6.6	356.4	3,408.1
1930	230.4	14.6	63.2	30.3	12.0	17.9	6.3	374.7	3,518.7
1931	245.2	15.4	60.1	35.2	12.6	17.6	7.0	393.1	3,489.8
1932	246.5	14.0	63.8	34.5	14.7	16.1	6.5	396.1	3,256.8
1933	220.1	14.9	62.5	32.2	14.6	16.3	5.9	366.5	3,245.5
1934	237.6	17.9	64.3	39.4	16.8	17.1	6.4	399.5	3,430.4
1935	253.9	21.4	68.7	42.6	18.0	17.6	6.9	429.1	3,675.9
1936	267.5	25.9	79.5	54.6	20.2	19.4	7.7	474.8	4,001.5
1937	295.3	28.5	84.6	60.7	23.0	21.1	8.1	521.3	4,249.2
1938	297.7	28.1	83.2	59.8	23.0	20.0	7.5	519.3	4,210.5
1939	308.0	31.5	85.5	62.7	24.1	21.2	8.0	541.0	4,406.7
1940	319.7	33.8	88.2	67.8	25.1	22.2	8.7	565.5	4,590.4
1941	343.9	36.4	94.8	75.5	26.7	24.2	9.5	611.0	4,859.2
1942	327.7	35.1	93.5	75.2	27.2	24.9	10.0	593.0	4,608.1
1943	322.7	35.7	94.0	74.7	27.1	25.6	9.8	589.6	4,480.2
1944	332.5	35.5	96.2	77.8	27.2	25.9	9.5	604.6	4,513.3
1945	360.3	38.5	102.4	82.4	29.5	26.8	9.5	649.4	4,834.7
1946	431.4	45.4	117.2	99.0	35.0	31.3	10.8	770.1	5,725.7
1947	479.0	51.1	133.4	115.8	42.3	35.7	12.3	869.6	6,512.6
1948	547.3	60.3	146.3	114.7	48.6	40.0	13.4	970.6	7,227.4
1949	571.5	64.8	153.0	123.9	53.0	42.2	14.6	1,023.0	7,692.6
1950	615.1	71.7	155.7	131.0	58.7	46.1	16.0	1,094.3	8,238.6
1951	655.9	75.3	163.7	72.3 3/	64.6	48.8	18.8	1,099.4	8,623.1

1/ It was necessary for the Bureau of Public Roads to approximate, in some cases, the segregation (into automobiles, buses, trucks and tractor trucks, trailers and semi-trailers, and motorcycles) of the information furnished by the states, because of the diversity in state registration practices. Therefore, not all of the data are strictly comparable.

2/ Detail may not add to totals because of rounding.

3/ Figure for Oregon in 1951 does not include trucks with gross weight of 4,500 pounds or less. These trucks were classified with automobiles.

Sources: 1920 to 1946 - Federal Works Agency, Public Roads Administration, "Highway Statistics, Summary to 1945."
1947 - Federal Works Agency, Public Roads Administration, "Highway Statistics, 1947."
1948 to 1950 - Department of Commerce, Bureau of Public Roads, "Highway Statistics," yearly.
1951 - Department of Commerce, Bureau of Public Roads, "State Motor-Vehicle Registrations - 1951," Table MV-1, May, 1952.

Table 4

FREIGHT HAULED BY TRUCKS IN THE WESTERN STATES 1/
1935-1951
(Billions of Ton-miles 2/)

Year	ON MAIN RURAL ROADS				ON LOCAL RURAL ROADS				ON ALL RURAL ROADS				
	Mountain States 3/	Pacific States 4/	Total 5/ West	Total 5/ United States	Mountain States 3/	Pacific States 4/	Total 5/ West	Total 5/ United States	Mountain States 3/	Pacific States 4/	Total 5/ West	Total 5/ United States	West as a % of United States
1935	n.a. 6/	n.a.	n.a.	22.30	n.a.	n.a.	n.a.	5.50	n.a.	n.a.	n.a.	27.80	n.a.
1936	1.39	3.25	4.63	28.00	0.41	0.85	1.25	6.86	1.79	4.09	5.89	34.86	16.9
1937	1.63	3.75	5.38	32.44	0.47	0.96	1.43	7.93	2.10	4.71	6.81	40.38	16.9
1938	1.84	4.10	5.94	35.70	0.55	1.08	1.63	9.03	2.39	5.18	7.56	44.73	16.9
1939	2.07	4.65	6.73	40.61	0.61	1.21	1.82	10.09	2.68	5.86	8.54	50.70	16.8
1940	2.38	5.21	7.59	46.25	0.70	1.35	2.06	11.52	3.08	6.56	9.64	57.77	16.8
1941	2.80	7.13	9.93	58.74	0.85	1.77	2.62	14.14	3.64	8.90	12.54	72.88	17.2
1942	2.35	6.98	9.33	45.70	0.54	1.56	2.10	10.05	2.89	8.54	11.43	55.76	20.4
1943	2.08	7.35	9.44	43.88	0.47	1.59	2.06	9.20	2.55	8.94	11.49	53.07	21.7
1944	2.17	8.68	10.85	44.70	0.49	1.91	2.40	9.58	2.66	10.59	13.25	54.28	24.4
1945	2.38	12.22	14.59	50.36	0.54	2.62	3.16	10.85	2.91	14.84	17.75	61.22	29.0
1946	3.46	12.88	16.35	60.89	0.71	2.63	3.34	12.62	4.18	15.51	19.69	73.51	26.8
1947	3.76	14.96	18.73	73.61	0.81	3.15	3.96	15.56	4.57	18.11	22.69	89.17	25.4
1948	4.93	14.63	19.56	83.12	0.93	3.28	4.21	17.02	5.86	17.90	23.77	100.14	23.7
1949	6.15	15.25	21.40	89.10	1.13	3.24	4.37	17.78	7.28	18.48	25.76	106.88	24.1
1950	8.04	17.68	25.73	121.09	1.43	3.90	5.34	22.11	9.48	21.59	31.06	143.20	21.7
1951	7.74	20.58	28.31	126.40	1.55	5.21	6.76	25.70	9.28	25.78	35.07	152.10	23.1

1/ Data are annual estimates including all intercity, inter-rural, city to rural, and rural to city hauls on public roads.
2/ Ton-mileage measures freight traffic as tonnage of shipments times miles carried; a ton-mile represents one ton of freight carried one mile.
3/ Mountain States are Arizona, Colorado, Idaho, Montana, Nevada, New Mexico, Utah, and Wyoming.
4/ Pacific States are California, Oregon, and Washington.
5/ Detail may not add to totals because of rounding.
6/ "n.a." - not available.

Source: Department of Commerce, Bureau of Public Roads, letter from Highway Transport Research Branch.

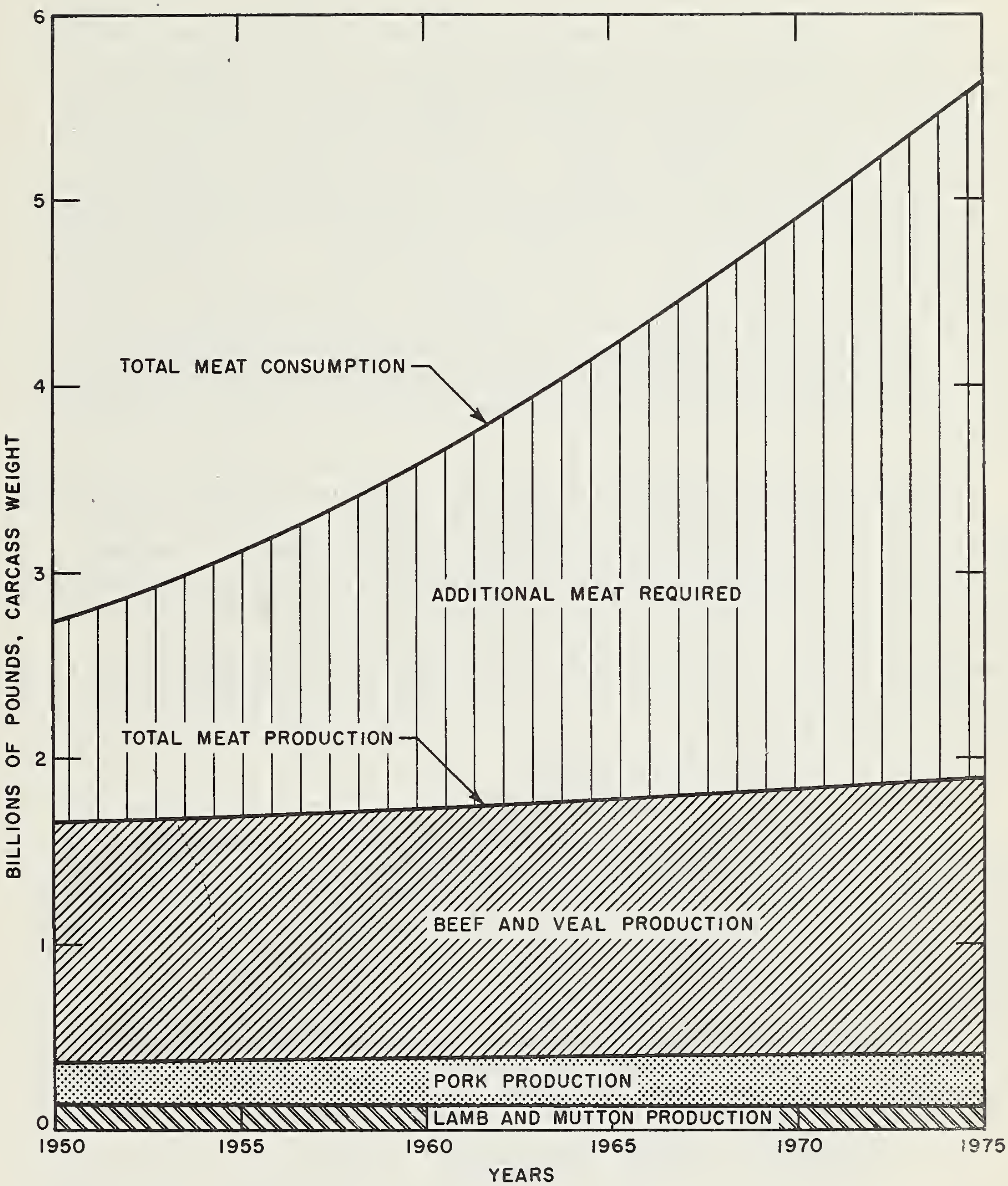

Figure 4

MEAT SUPPLY — CONSUMPTION BALANCE, 1950 – 1975
PACIFIC SLOPE STATES
BILLIONS OF POUNDS, CARCASS WEIGHT

8-657-5

Section IV

SUPPLY-CONSUMPTION RELATIONS IN THE PACIFIC SLOPE STATES

Since the function of transportation is to move commodities from one place to another, it is essential to analyze the fundamental economic factors which lie behind the present and potential movement of commodities to determine specific transportation problems. The concept of the supply-consumption balance is a convenient tool for analyzing regional commodity marketing and transportation problems. It provides insight and understanding of general price relationship for commodities traded within and between regions. In a general way, it explains the location of commodity supply areas in relation to markets and the direction of intraregional and interregional trade. The concept is most meaningful in the cases where disparate relationships prevail in the supply-consumption situation of a commodity. It is of importance in determining significant factors underlying the movement of agricultural products from producing areas to consumption points.

The specific aim of this section is to present information on the regional trade balance for commodities in which the Pacific Slope States are in a deficit supply position with relation to consumer requirements. Supply-consumption studies were therefore made for the major milk and livestock products. Funds available for the project did not permit a detailed supply-consumption analysis of other commodities covered in this study. However, it is apparent that potatoes and wheat will continue to be commodities that are surplus to the Pacific Slope States.

A. Meat Consumption and Production

As a result of the rapid population growth of the Pacific Slope States, consumption of meats in the region has been rising faster than meat production. The supply-consumption relationships and the geographical location of supply areas differ markedly for the different classes of livestock. The bulk of the pork needs of the Pacific Slope are obtained from the Corn Belt where the hog industry of the nation is concentrated. Requirements of beef and veal can only be met by reaching east into the Mountain States and Texas. Supplies of mutton and lamb in the Pacific Slope States are adequate for the time being in meeting regional requirements.

1. Projection of Meat Consumption

Purcell and Brensike have compared two methods for measuring regional consumption of different classes of red meats and for determining the regional production-consumption balances:

(1) Deduct net farm marketings from commercial slaughter;[1/] and (2) Deduct estimated total consumption from total production.[2/] According to the first method, meat consumption of the farm population is omitted from the calculation, and the residual measures a surplus or deficit position, without reference to total consumption in the region. Table 5 gives the 1952 position by this method. In the second method, the residual is determined by the consumption of the entire population. In Table 6 the meat balance determined by this method is shown for 1947-52 and projected to 1963 and 1975. Substantially similar results were obtained by the two methods. However, the second method is preferred for the present purpose because it facilitates projection of the future regional meat supply-consumption balance.

Consumption levels are based upon Purcell and Brensike's study of regional differences in per capita meat consumption rates.[3/] The outstanding feature of these estimates is the relatively high consumption of beef and veal, high consumption of lamb and mutton, and the low consumption of pork in the western states. Beef and veal consumption rates are 15 percent higher, and lamb and mutton 40 percent higher, than the national average; pork is 6 percent below the average. These relationships were projected to 1963 and 1975 from Rex F. Daly's projection of meat consumption for 1970, based upon high employment conditions.[4/]

According to the period of estimation, the Pacific Slope was short slightly over one billion pounds of red meat products, carcass weight basis, in the recent period 1947-52 (Table 5). The extent of the deficit may be noted by observing that nearly a third of the meat required is obtained outside the region. The region was short of cattle, calves, and hogs, but had a surplus of sheep and lambs. The shortage of cattle and calves was about 8 percent of requirements. Hog production was only a fourth of the regional deficit. Almost 80 percent of the sheep and lambs produced were consumed in the region.

1/ Net marketings represent the volume entering commercial channels and commercial federally inspected and noninspected slaughter measures the volume of meat consumed by the nonfarm population.

2/ Purcell, J. C. and V. J. Brensike. Net marketing and slaughter of livestock and consumption of meat by regions, 1950. U. S. Department of Agriculture, Bureau of Agricultural Economics, unpublished manuscript. 1951.

3/ Ibid., p. 12.

4/ Daly, R. F., Appraisal of the Long Run Prospects for Agriculture. Bureau of Agricultural Economics, U. S. Department of Agriculture, unpublished study. 1951. High employment projection.

Table 5

ESTIMATED SUPPLY-CONSUMPTION BALANCE OF MEAT 1947-52, AND PROJECTIONS TO 1963 and 1975, PACIFIC SLOPE STATES

(Millions of Pounds--Carcass Weight)

Commodity	1947-52			1963			1975		
	Supply 1/	Consumption 2/	Surplus or Deficit	Supply 1/	Consumption 2/	Surplus or Deficit	Supply 1/	Consumption 2/	Surplus or Deficit
Beef and Veal	1,290	1,404	- 114	1,374	2,078	- 704	1,483	2,993	-1,510
Pork	232	1,200	- 968	263	1,709	-1,446	289	2,416	-2,127
Lamb and Mutton	124	102	+ 22	126	156	- 30	111	234	- 123
All Meat	1,646	2,706	-1,060	1,763	3,943	-2,180	1,883	5,643	-3,760

1/ Meat production per animal derived from R. F. Daly.
2/ Per capita meat consumption based on Daly projection to 1970 and adjusted to regional level according to Purcell and Brensike. See text.

Table 6

SURPLUS AND DEFICIT SUPPLY OF SPECIES OF LIVESTOCK AND ALL MEATS, PACIFIC SLOPE, 1952
(Millions of Pounds--Live Weight)

Pacific Slope States	Cattle and Calves				Sheep and Lambs				Hogs				All Animal Meats			
	Production	Net Marketing	Commercial Slaughter	Surplus or Deficit 1/	Production	Net Marketing	Commercial Slaughter	Surplus or Deficit 1/	Production	Net Marketing	Commercial Slaughter	Surplus or Deficit 1/	Production	Net Marketing	Commercial Slaughter	Surplus or Deficit 1/
California	965	637	1,933	-1,296	100	98	189	-91	124	141	547	-406	1,189	876	2,669	-1,793
Idano	309	203	73	+ 130	78	77	3	+74	53	52	44	+ 8	440	332	120	+ 212
Oregon	330	218	200	+ 18	30	42	19	+23	53	50	106	- 56	413	310	325	- 15
Washington	259	159	287	- 128	20	20	14	+ 6	44	33	183	-150	323	212	484	- 272
Arizona	233	172	75	+ 97	15	12	1	+11	7	7	32	- 25	265	191	108	+ 83
Utah	181	134	108	+ 26	65	72	24	+48	19	23	63	- 40	265	229	195	+ 34
Nevada	139	124	16	+ 108	20	22	1	+21	6	6	3	+ 3	165	152	20	+ 132
TOTAL	2,416	1,647	2,692	-1,045	337	343	251	+92	306	312	978	-666	3,059	2,302	3,921	-1,619

1/ Net marketings over commercial slaughter.

Source: U. S. Department of Agriculture, Bureau of Agricultural Economics, Farm Production, Disposition, and Income, Meat Animals, 1951-1952.
U. S. Department of Agriculture, Bureau of Agricultural Economics, Livestock Slaughter, by States.
U. S. Department of Agriculture, Production and Marketing Administration, Livestock Market News Statistics, 1952.

A look at the production-consumption balance of the various classes of livestock in the states of the region is revealing (Table 6). The heavy concentration of population along the West Coast results in the greatest deficit position, generally speaking, in California, Washington, and Oregon. California is the only state deficient in the production of all livestock species. Washington and Oregon have a slight surplus production of sheep and lambs, and Oregon has a small surplus of beef production. All the states with the exception of Idaho and Nevada produce insufficient supplies of hogs.

Only a small increase in hog numbers may be expected in the period ahead. As a result, the prospects are for a persistently growing regional deficit in the production of pork. The striking conclusion resulting from the projections is the prospective regional shortage of sheep and lambs, amounting to an annual deficit of 30 million pounds by 1963 and 120 million pounds by 1975.

In recent years the pork deficit accounted for the major portion of the deficit of the Pacific Slope. As time goes on, the shortage of beef and veal may be expected to grow rapidly, in spite of an expected increase in the supply within the region. The shortage of veal and beef is expected to rise from 8 percent in recent years to 40 percent of requirements by 1975.

The state of California is largely responsible for the growing deficit position of the region in the production of meats. California production is about a third of the regional output of meat, but commercial slaughter in the state constituted two-thirds of the total in 1952. As far as the hog situation is concerned, California is responsible for two-thirds of the total deficit. While the state does not produce an adequate supply of sheep and lambs, other states in the region more than compensate for the deficit.

The projections anticipate that the regional deficit may more than double by 1963, ten years hence, and may reach nearly 3.8 billion pounds by 1975. Consumption is expected to increase at a growing rate from 90 to 140 million pounds annually in the course of the next two decades; but production of all meats (discussed in more detail later) may be expected to gain only at the rate of approximately 120 million pounds every dozen years, an average of about 10 million pounds per year. This adverse relationship will result in a substantial extension of the region's meat supply areas farther and farther to the east. The prospects of a declining sheep and lamb population will mean that the Mountain States will be shipping increasing amounts to the Pacific Coast States. The hog supply area of the region already extends into the Corn Belt. It would appear that the beef and veal supply area will also soon be firmly based in the Corn Belt States.

2. Projection of Livestock Production

Livestock numbers rose steadily in the West until peak production was reached during World War I. Numbers of feed-consuming animal units[1] have continued on a plateau since then. Since the predepression period, 1924-29, there has been a steady increase in the importance of cattle kept for milk. Beef cattle numbers have shown the usual cyclical fluctuations over the last two decades, but with a moderate upward trend. Relative importance of hogs remained almost unchanged, but sheep and lamb numbers showed a most striking decline, dropping nearly 50 percent over the two decades.

In recent years, beef and dairy cattle required the vast bulk of the feed consumed by livestock on the Pacific Slope. Requirements for beef cattle production were about 60 percent of the feed required by all cattle, which was equivalent to 45 percent of all feed consumed by livestock. Dairy cattle consumed 31 percent of the feed. The large sheep industry, next in importance, consumed only 15 percent of feed requirements. Production of hogs constituted a demand of only 3 percent of the feed requirements for livestock production in the region. The balance of 6 percent was consumed by horses and mules.

Daly's projection for high employment conditions forecasts a livestock population of 112 million feed-consuming animal units in the United States by 1970, compared to 96 million animal units in 1949.[2] This projection envisages a moderate increase in total animal units over the next two decades, a rise to 105 million units by 1963, a decade hence, and to 117 million units by 1975. Numbers of livestock by species have also been projected for 1963 and 1975. The projection problem consisted of two steps. The ratios of regional and national livestock numbers, by species, were projected to 1975 by a linear extrapolation in the logarithms of the trend between the prosperity periods of 1924-29 and 1947-52. Regional livestock numbers were computed by applying the ratios to the livestock population estimated by Daly for the United States in 1970. Projections for 1963 were interpolated.

There are several advantages in basing the projections on the two prosperity periods of 1924-29 and 1947-52. It provides a projection based upon comparable economic periods representing conditions of full employment. By omitting the pre-World War II years, when unemployment still continued high, a more conservative forecast is obtained for all classes of livestock in the

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1/ Feed consumed by all livestock is measured in animal units. The amount of food consumed by a cow is one animal unit; a hog, one-fifth an animal unit; and sheep, one-fifth an animal unit.
2/ Daly, Rex F. op. cit.

region. The projection anticipates an increase of 0.5 million animal units in the Pacific Slope region by 1963 from the period 1947-52, and an increase of 1.3 million units, to reach 10.2 million animal units, by 1975 (Table 7).

Some striking developments appear to be in prospect in the distribution of livestock species compared to the recent postwar period. In spite of the declining demand for milk fats in recent years, cattle kept for milk promise to continue to increase in importance.[1/] Considered in terms of total animal feed units, it is expected that dairy cattle will increase from 31 to 36 percent. Nearly half, 48 percent, of the region's animal feed requirements may be consumed by beef cattle in 1975. Sheep and lambs may be expected to decline to 11 percent, a drop of 4 percent of total animal units by 1975. The relative position of hogs is expected to remain unchanged at about 3 percent of regional feed requirements. Horses and mules will decline in numbers from 6 to 2 percent of total animal feed units.

3. Feed-Producing Capacity in the West

The projections of the livestock population of the Pacific Slope may be evaluated in terms of the anticipated feed-producing capacity of the region. As time goes on, more and more of the livestock in the West will be produced on cultivated pastures and cropland. Irrigation agriculture will continue to become a more important source of livestock production. With this in mind, the additional irrigation accruing from the program of the Bureau of Reclamation has been examined to determine the feed-producing capacity expected to be added.

Historically, irrigation development by private individuals, commercial interests, and mutual groups has been very important. Private projects have been developed for the most part from ground water sources. As a general rule, private enterprise has irrigated smaller tracts, and projects with lower cost of irrigation development than those irrigated by public agencies. As time passes and ground water sources become less available, only the more expensive projects will remain, and the relative cost of developing land for irrigation will increase. Potentialities for continued irrigation development by private interests exist in many areas of the region but appear to be particularly good in southern Idaho. For obvious reasons, private development is difficult to predict. It is dependent on the availability of ground water with a satisfactory water table, and on the relative favorability of farm prices.

1/ Projection based on prewar and postwar periods would have raised the 1975 figure by little more than one percent.

Table 7

NUMBER OF LIVESTOCK BY SPECIES AND TOTAL ANIMAL UNITS IN
PACIFIC SLOPE STATES AND UNITED STATES
SELECTED PERIODS AND PROJECTIONS FOR 1963 AND 1975
(Thousands of Head)

	Pacific Slope			1963		1975	
Animals	1924-29	1936-40	1947-52	Pacific Slope 1/	United States	Pacific Slope 1/	United States
Cattle Kept for Milk	2,079	2,508	2,771	3,080	37,300	3,620	39,850
Beef Cattle	3,863	3,945	5,057	5,560	52,000	6,180	62,400
Hogs and Pigs	1,473	1,739	1,318	1,420	66,600	1,520	76,000
Sheep and Lambs	12,661	11,985	6,514	6,430	38,300	5,500	43,000
Horses and Mules	1,348	931	538	350	5,100	235	3,360
Total Animal Units	9,344	9,340	8,922	9,455	--	10,200	--
Total United States	96,437	95,688	97,954	--	104,980	--	116,930

1/ Pacific Slope figured as a ratio of United States and based on 1970 projection for United States by R. F. Daly.

As long as the prospects for good farm prices continue, substantial additional irrigation by private interests may be expected in the future. Increasing intensity of farm production and improved cultural practices will continue to add to the feed-producing capacity of western farm lands aside from the addition of new irrigated lands. As a result, the potential capacity measured by the Bureau of Reclamation program may be considered indicative of a minimum development of the western agricultural feed base. But the fact that the feed-producing capacity of the irrigated acreage is more than the projection of livestock numbers indicates the reasonableness of the projections.

The measures of the feed-producing capacity per irrigated acre in animal unit years developed by Selby and Griffith[1/] for each of the western states were adjusted upward to provide for increasing productivity over time. Their original estimates based on the 1939 census were adjusted upward at the rate of one percent a year based upon the experience in the western states.

Of the 967,500 acres of full irrigation programmed between 1952 and 1959 on the Pacific Slope, the principal addition is planned in the state of Washington by the development of 489,000 acres, nearly all in the Columbia River Basin. Another 286,100 acres of full irrigation are planned in California, most of it in the Central Valley Project; 78,900 in Idaho; 67,700 in Arizona; and 16,000 in Utah. By 1959 the two major projects under way in the western states, the Columbia Basin and the Central Valley Projects, will add 644,500 acres, or nearly 70 percent of the full irrigation planned in the Pacific Slope States.

For comparison with the projections of livestock numbers, the 1959 irrigation program of the Bureau of Reclamation was considered to reach full development by 1963. The entire program of the Bureau is assumed to be completed in 1975. Following Selby and Griffith's procedure, supplemental irrigation was assumed to result in a 20 percent increase in production.

There were 8.922 million animal units of feed-consuming livestock, including horses and mules, in the Pacific Slope States in 1947-52. Irrigation, both new and supplemental, added by 1963 is estimated to increase the feed-producing capacity of the agriculture of the Pacific Slope by 778 thousand animal units (Table 8), an increase of 24 percent over the 1939 level. The full program of the Bureau of Reclamation is estimated to add a feed-producing capacity of 2.129 million animal units.

1/ Selby, H. E. and D. T. Griffith. Livestock Production in Relation to Land Use and Irrigation in the Eleven Western States.

Table 8

ESTIMATES OF ADDITIONAL FEED-PRODUCING CAPACITY FOR LIVESTOCK ON THE PACIFIC SLOPE, BUREAU OF RECLAMATION, 1959 IRRIGATION PROGRAM AND ULTIMATE IRRIGATION PROGRAM

Pacific Slope States	June 30, 1959 Program New Irrigation (Thous.Acres)	Supplemental Irrigation (Thous.Acres)	Total Additional Irrigation 1/ (Thous.Acres)	Feed-Producing Capacity 2/ (Thous.AUY)	Ultimate Program New Irrigation (Thous.Acres)	Supplemental Irrigation (Thous.Acres)	Total Additional Irrigation 1/ (Thous.Acres)	Feed-Producing Capacity 2/ (Thous.AUY)
California	333.3	368.1	406.9	261.6	612.3	810.4	777.4	548.1
Idaho	91.4	650.0	221.4	122.0	317.0	650.0	447.0	335.3
Washington	501.5	7.0	501.6	327.0	1,040.4	7.0	1,040.5	922.9
Oregon	27.3	51.8	37.7	17.1	31.8	86.3	49.1	30.3
Arizona	67.7	14.2	70.5	39.5	72.6	659.3	204.5	125.6
Utah	16.0	31.0	22.2	10.2	202.5	266.4	255.8	159.4
Nevada	2.5	0.0	2.5	0.9	12.5	30.0	18.5	7.7
Total	1,039.7	1,122.1	1,262.8	778.3	2,289.1	2,509.4	2,792.8	2,129.3

1/ Total additional irrigation is new irrigated land plus 20 percent of supplemental irrigated land. Estimations of 20 percent increase in production are based upon a study by Guthrie, J.A., et al, Markets and New Hands, Columbia Basin Joint Investigations, pp. 11-13, 16.

2/ Animal Unit Years: 1939 animal unit years - California 0.518, Idaho 0.444, Washington 0.553, Oregon 0.365, Arizona 0.451, Utah 0.369, Nevada 0.306, increased at the rate of one percent per year, 24 percent for 1963, and 36 percent for the ultimate program, arbitrarily taken as 1975. Factors presented in Table 3, p. 39, Selby and Griffith, Livestock Production in Relation to Land Use and Irrigation in the Eleven Western States.

Source: U. S. Department of Agriculture, Bureau of Reclamation Report, Annual Report of the Secretary of the Interior, Fiscal Year Ending June 30, 1952.

If the two programs are completed by the assumed dates, the region could accommodate 9.7 and 11.0 million animal units by 1963 and 1975, respectively.[1] These figures compare favorably with the projections of 9.4 million and 10.2 million animal units by 1963 and 1975, respectively.

B. Dairy Products Consumption and Production

It is in the nature of the economics of the milk industry to meet the demands of urban communities for fluid milk, cream, and ice cream in nearby milk supply areas. A continuing deficiency of milk supplies results directly in a reduction in the volume of milk products manufactured in the region. The prospect of a rapid expansion of the population of the seven Pacific Slope States over the next two decades is going to have a profound effect upon the consumption of fluid and manufactured milk products.

1. Consumption of Milk Products

In 1949 apparent consumption of fluid milk, cream, and ice cream in the Pacific Slope States amounted to 6,889 million pounds. Butter requirements in the seven states were about 142 million pounds, over half of which were consumed in the state of California (Table 9). Apparent consumption of cheese in the region was 112 million pounds.

Apparent consumption of evaporated and condensed milk in the Pacific Slope States was estimated at 607.5 million pounds, milk equivalent, in 1949. This was about 60 percent of the volume of milk equivalent utilized for cheese and about 20 percent of the volume used for butter (Table 9). Apparent consumption of dried milk in the Pacific Slope States in 1949 was estimated at 481 million pounds. This was about 80 percent of the volume of milk equivalent utilized in condensed and evaporated milk.

With the expected population increases, the consumption of fluid milk, cream, and ice cream may be expected to increase over the 1952 level by 37 percent in 1963 and by 77 percent in 1975. The future demand for the major manufactured milk products differs considerably among products. In projecting the supply-consumption balance of the Pacific Slope States, it is assumed that regional and national levels of per capita consumption of fluid milk and cream, butter, cheese, evaporated and condensed milk, and dried milk solids are identical. Ice cream production in the region is equated to consumption.

1/ Without the productivity adjustment, comparable projections are 9.6 and 10.6 million animal units.

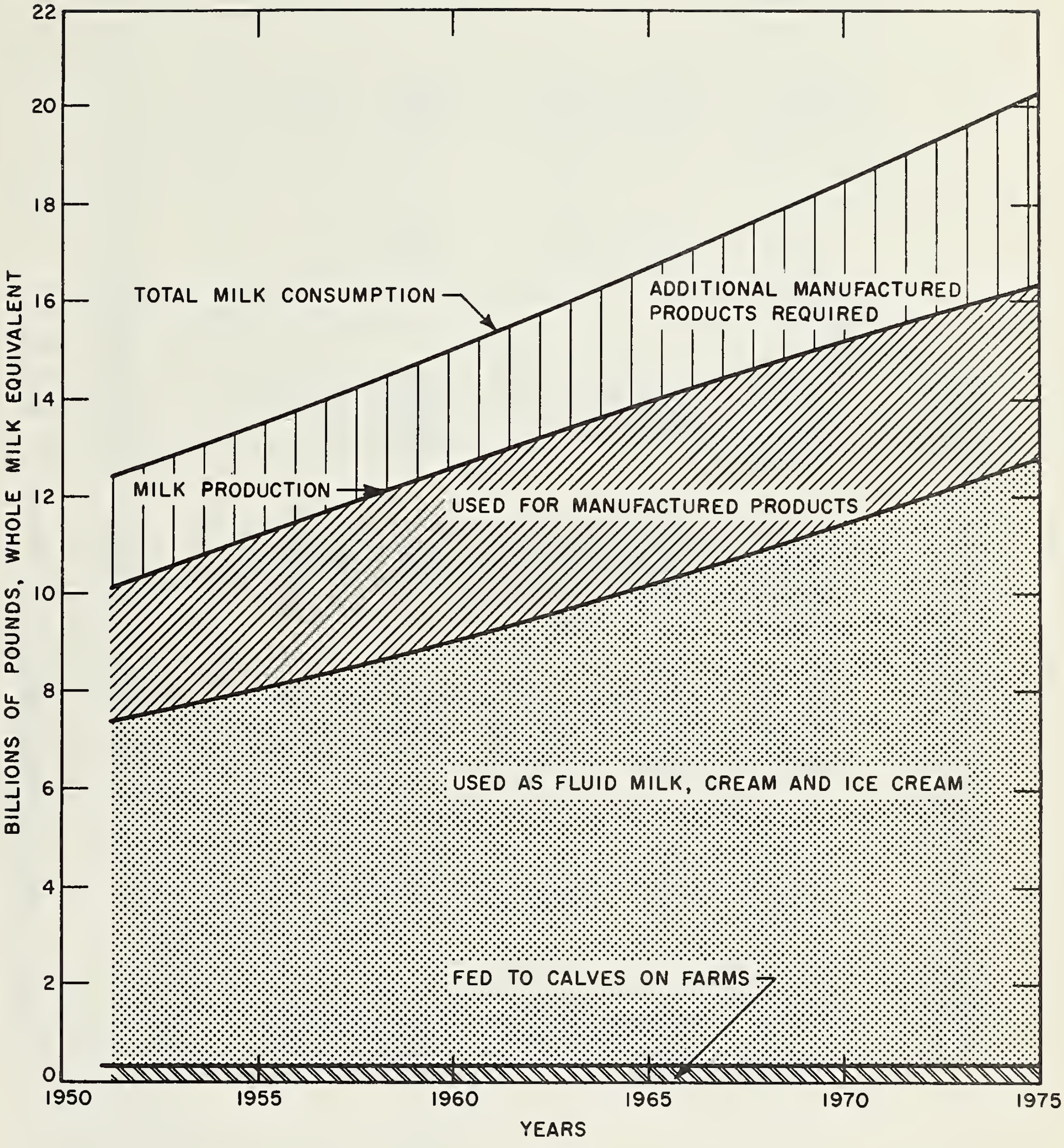

Figure 5

MILK SUPPLY — CONSUMPTION BALANCE, 1952 — 1975
PACIFIC SLOPE STATES
BILLIONS OF POUNDS, MILK EQUIVALENT

B-657-6

Table 9

PRODUCTION, NET SHIPMENTS, AND APPARENT CONSUMPTION OF MILK, CHEESE, CREAMERY BUTTER, CONDENSED AND EVAPORATED MILK, AND DRIED MILK, PACIFIC SLOPE STATES, 1949

	Total Milk Production and Supply (Mil.Lbs.)	Cheese[1/] Product Weight (Thous.Lbs.)	Cheese[1/] Milk Equivalent (Mil.Lbs.)	Creamery Butter Product Weight (Thous.Lbs.)	Creamery Butter Milk Equivalent (Mil.Lbs.)	Condensed and Evaporated Milk Product Weight (Thous.Lbs.)	Condensed and Evaporated Milk Milk Equivalent (Mil.Lbs.)	Dried Milk[2/] Milk Equivalent (Mil.Lbs.)	Total Manufactured Milk Products[3/] Milk Equivalent (Mil.Lbs.)
Production[4/]									
California	5,905	9,573	92.4	36,734	736.6	361,710	649.4	61.0	2,166
Idaho	1,160	20,682	199.1	23,908	476.0	n.a.[5/]	158.6	347.8	843
Washington	2,007	5,920	54.6	20,708	396.8	75,789	148.4	169.1	710
Oregon	1,302	24,691	225.0	17,889	318.8	n.a.	61.6	92.2	670
Arizona	261	635	5.7	702	14.5	n.a.	11.7	0.0	55
Utah	669	11,342	107.8	5,515	117.4	63,832	133.4	60.8	385
Nevada	103	539[6/]	0.1	919	19.3	0	0.0	3.6	32
Total	11,407	73,382[6/]	684.7	106,375	2,079.4	n.a.	1,163.1	734.5	4,861
Inshipments[7/]	1,195	40,208	406.1	36,902	749.1	0	0.0	0.0	n.a.
Outshipments[8/]									
Offshore Shipments	517	1,180	12.0	243	4.9	145,442	314.1	97.8	n.a.
Exports	335	693	6.7	932	18.7	111,388	241.5	155.8	n.a.
Total	852	1,873	18.7	1,175	23.6	256,830	555.6	253.6	n.a.
Net Shipments	+ 343	+ 38,335	+ 387.4	+ 35,727	+ 725.5	- 256,830	- 555.6	- 253.6	n.a.
Apparent Consumption	11,750	111,717	1,072.1	142,102	2,804.9	n.a.	607.5	480.9	n.a.

1/ Cheese excludes full skim American and cottage cheese.
2/ Dried milk includes whole milk and skim milk products.
3/ Includes other manufactured milk products.
4/ U. S. Department of Agriculture, Bureau of Agricultural Economics, Production of Manufactured Dairy Products, 1949, p. 40, Tables 23 and 27; p. 47, Table 34; and p. 48, Table 35.
5/ Not available, less than 3 plants reporting.
6/ Includes some production in New Mexico.
7/ Harrington, A. H. and Wendell Calhoun, The Dairy Balance of the Pacific Slope, p. 6, Table 2.
8/ Ibid., p. 9, Table 3.

Consumption of all milk solids in the United States increased from 70.8 pounds per person annually in the period 1935-39 to 74.6 pounds in 1952. Over the same period, per capita consumption of milk fats declined from 31.2 to 27.3 pounds, but consumption per person of milk solids, not fat, rose from 39.6 to 47.3 pounds. The persistent decline in butter consumption, nearly 50 percent since the prewar period, is primarily responsible for the drop in the consumption of milk fat. Besides the major competition attributable to margarine, there has been a strong trend in the postwar period to replace milk fat by cheaper vegetable fats in a number of food uses. In addition, there has been a growing preference on the part of consumers for low-fat milk products.

Since World War II the downward trend in per capita consumption of cream has been coupled with an upsurge in the consumption of fluid skim milk. Simultaneously, per capita consumption of certain other manufactured dairy products has been increasing. The most notable of these is ice cream, for which consumption per person increased from 9.8 to 17.6 pounds between 1941 and 1952.

Projected consumption rates are based on a study by H. C. Kriesel.[1/] Rates for 1963 were interpolated logarithmically. The projections are modified only to the extent of lowering the butter consumption rate to 5 pounds per capita instead of the 4 pounds per capita assumed by Kriesel. Consumption of whole milk cheeses is expected to rise from 7.5 pounds in 1952 to 8.5 pounds in 1975. Evaporated milk consumption of 14.0 pounds in 1975 compares with the 1952 level of 15.5 pounds; likewise, consumption of condensed milk is assumed unchanged. The national level of ice cream consumption is assumed to drop per person from the 1952 figure of 17.6 pounds to 15.0 pounds. Finally, fluid milk and cream are assumed to fall from 350.0 pounds to 340.0 pounds per capita between 1952 and 1975.

These assumed consumption rates would result in a regional consumption of 18,582 million pounds in 1963 compared to the 1952 level of 16,533 million pounds on a whole milk basis. On a comparable basis, milk consumption is projected to rise to 20,061 million pounds by 1975 (Table 10).

2. Production of Milk Products

Farms in the Pacific Slope States produced 11,407 million pounds of milk, and apparent consumption in the region was 11,750 million pounds in 1949 (Table 9). Inshipments of 1,195 million pounds of manufactured milk products exceeded outshipments from the region. Of the 852 million pounds of milk

1/ The Dairy Situation, September-October 1953. p. 11 ff and Tables 4 and 5.

Table 10

CONSUMPTION OF MILK AND MILK PRODUCTS, 1952, AND PROJECTIONS TO 1963 AND 1975, PACIFIC SLOPE STATES AND THE UNITED STATES
(Millions of Pounds--Product Weight)

	1952 1/		1963 2/		1975 1/	
	Pacific Slope	United States	Pacific Slope	United States	Pacific Slope	United States
Fluid Milk and Cream	6,278	55,257	8,634	63,658	11,257	71,910
Ice Cream	314	2,763	408	3,010	497	3,173
Butter	153	1,350	166	1,222	166	1,058
Cheese 3/	134	1,177	198	1,441	281	1,798
Evaporated and Condensed Milk	310	2,731	416	3,046	526	3,363
Total milk (Whole Milk Fat Equivalent	16,533	145,522	18,582	137,000	20,061	128,923
Pacific Slope Percent of United States	11.4%		13.6%		15.6%	

1/ Consumption figures, except butter, are based on per capita estimates in Kriesel, H. C., The Dairy Situation, Sept.-Oct. 1953.
2/ Obtained by logarithmic linear interpolation.
3/ Excludes skim milk cheeses.

products shipped out, 517 million pounds were sent to United States territories. A little more than 40 percent of the total production of milk on the Pacific Slope in 1949 was manufactured into butter, cheese, evaporated and condensed milk, dried milk, and other products of milk. In terms of whole milk used, butter was the most important manufactured milk product, in spite of its declining importance as an outlet for whole milk in the national market. Butter was almost three times as important as cheese, and these two commodities accounted for 57 percent of the volume of milk manufactured (Table 9). Almost all the balance, about 39 percent of the total volume of milk manufactured, was evaporated and condensed milk and dried milk.

About half of the 1,163 million pounds of milk manufactured into condensed and evaporated milk on the Pacific Slope were shipped to domestic offshore and export markets. The importance of exports is indicated by the fact that over 20 percent of production of condensed and evaporated milk in these states went into foreign markets. Over a third of total production of dried milk moved into the domestic offshore and export markets, the latter accounting for 156 million pounds, milk equivalent.

Milk production in the states of Pacific Slope has been projected for the purpose of determining the nature of the future regional supply-consumption balance. The procedure has been adapted from the analysis by Rex F. Daly.1/ The projections for the states of the region have been projected linearly in the logarithms in accordance with Daly's procedure. In examining the behavior of milk production trends over the last two to three decades, it was found that production trends resulting from extrapolating the prosperity period of 1924-29 and the postwar high employment conditions of 1947-52 are somewhat divergent from the trend derived from the late depression period of 1935-39 and the 1947-52 period. In projecting milk production figures, the trend of the last two periods was preferred because it more accurately reflects the substitution problems that have confronted the dairy industry in the postwar years. The shorter term relationship reflects the declining trend in the market for milk fats, and especially the declining production of butter in recent years.

C. Consumption-Production Balance

If these projected changes in the regional supply-consumption balance were to materialize, the impact on the trade for manufactured milk products is going to be very significant. It is estimated that the Pacific Slope region was short of manufactured milk products in 1952 by a fourth of regional requirements or 1.3 billion pounds (Table 11). The total regional deficit amounted to about 12 percent of production.

1/ Daly, R. F., op.cit.

Table 11

ESTIMATED PRODUCTION AND UTILIZATION OF WHOLE MILK AND MILK PRODUCTS, PACIFIC SLOPE STATES
1952, 1963, and 1975
(Millions of Pounds--Whole Milk Basis)

	1952	1963	1975
Milk Production	11,119	13,600	16,300
Fed to Calves on Farms 1/	332	332	322
Net Available for Human Consumption	10,787	13,268	15,968
Used as Fluid Milk, Cream 2/ and Ice Cream (Whole Milk Equivalent)	7,050	9,639	12,479
Net Available For Manufactured Milk Products	3,737	3,629	3,489
Consumption of Manufactured Milk Products 3/	5,051	6,200	7,387
Additional Milk Required for Manufactured Milk Products	1,314	2,571	3,898

1/ Farm Production, Disposition, and Income from Milk 1951-52, U. S. Department of Agriculture, Bureau of Agricultural Economics, April 1953, p. 12.

2/ Estimates based on United States per capita consumption figures from The Dairy Situation, Sept.-Oct., 1953.

3/ Estimate based on United States per capita consumption figures from the above source (milk fat estimated as 3.99 percent of whole milk from Farm Production, Disposition and Income from Milk, p. 11).

The projection of milk production and consumption indicates that the regional deficiency may be expected to increase over the next two decades. By 1963, it may reach 2.6 billion pounds, or double the present deficit. Assuming the persistence of these trends, the deficit will reach 3.9 billion pounds by 1975. By that time, the region would be producing only about three-fourths of its total requirements in fluid and manufactured milk products. The projections indicate that a constant residual supply of milk in the neighborhood of 3,500 million pounds will be manufactured annually throughout the 23-year period, so that increasing amounts of manufactured milk products will need to be shipped into the region to continue to meet the demands of the growing population.

Section V

COMMODITY MOVEMENT PATTERNS IN THE PACIFIC SLOPE STATES

The pattern of commodity movements into, within, and out of the Pacific Slope area provides a general indication of the type of transportation and marketing problems that will face western producers and processors of agricultural commodities in expanding areas.

This section of the report is devoted to a discussion of commodity movement patterns in 1952 for selected commodities. For some commodities, much of the data relate to California, the largest consuming area in the West.

A. Dairy Products

The analysis of the movement of dairy products is confined to manufactured dairy products since the transportation of fluid milk is usually limited to short distances from the producing area. The movement of butter and cheese is discussed here because they are the best indicators of interregional movement of manufactured milk products.

1. Movement of Butter

A complete picture on the interregional movement of manufactured dairy products cannot be developed, because full information on movements is not available. However, the outlines of the traffic movement pattern can be traced by piecing together available information.

A principal characteristic of the pattern of butter movement as it affects the Pacific Slope is the large shipment of butter into California from relatively long distances. As Table 12 shows, about 65 percent of the receipts of butter in the San Francisco and Los Angeles markets[1/] originated outside the eleven western states, with 5 percent originating in the four Mountain States, 18 percent originating in Pacific Slope States other than California, and 12 percent originating within the state. These figures illustrate the importance of the movement of butter from the Midwest into California.

During 1952, about 70 percent of the butter received in Los Angeles and San Francisco from other Pacific Slope States came from Idaho. Oregon, Washington, and Utah also shipped some butter into California.

1/ It is assumed that receipts in the San Francisco and Los Angeles markets accounted for all the receipts from outside the state.

Table 12

ORIGIN OF RAIL AND TRUCK RECEIPTS OF BUTTER
LOS ANGELES AND SAN FRANCISCO MARKETS, 1952
(Volume in Tons)

	Origin										
Transport	Calif.	Idaho	Wash.	Ore.	Ariz.	Utah	Nev.	Pacific Slope	Four Mountain States	Other States	Total U. S.
Rail	377	343	527	499	0	21	0	1,767	403	18,346	20,516
Truck	3,597	3,897	17	429	0	281	4	8,225	1,130	2,747	12,102
TOTAL	3,984	4,240	544	928	0	302	4	9,992	1,533	21,093	32,618

Source: Reports of Federal-State Market News Service, San Francisco.

Almost 63 percent of the total market receipts in Los Angeles and in San Francisco were by rail. This reflects the fact that a large percentage of the receipts came from points at distances which make rail transportation more desirable than truck.

Of the total rail movements into Los Angeles and San Francisco, almost 90 percent originated outside the eleven western states. The shorter operating area of motor trucks is indicated by the fact that only about 23 percent of the tonnage hauled by truck originated outside the eleven western states. On the other hand, trucks hauled over 82 percent of the total tonnage moved to Los Angeles and San Francisco from within the Pacific Slope and almost 74 percent of the tonnage from the four Mountain States. Of the 4,240 tons shipped in from Idaho, about 92 percent moved by truck.

The one percent Waybill Sample of the Interstate Commerce Commission presents rather comprehensive information on rail movement, but it involves some problems of evaluation. The sample data indicate that 260 thousand tons of butter were carried by railroad in the United States in 1952, of which approximately 8 percent moved to California and about 11 percent moved to the Pacific Slope region (Appendix Table A-4). The data record no interstate movement in the Pacific Slope States.

A check on the Waybill Sample is possible from the market receipts statistics of the Federal-State Market News Service recording the movement into the state of California.1/ There is a close check between the ICC sample which indicates a rail movement of 20.8 thousand tons compared with the rail receipts figure of 20.5 thousand tons in 1952 (Table 12 and Appendix Table A-4). Receipts statistics record that the volume of butter shipped from the states of Idaho, Washington, and Oregon is larger, generally, than the volume originated in California, a fact that indicates the deficiency of the ICC Waybill Sample for small-volume movement (Appendix Table A-5).

The trend in receipts of butter at the San Francisco and Los Angeles markets over the last ten years reflects the declining consumption of butter. During the wartime program for conserving gasoline and rubber, there was a sharp decline in the percentage of truck receipts of butter in both San Francisco and Los Angeles, and a corresponding increase in rail transportation. Truck transportation quickly recovered from the low level of the war period, and in 1949 reached a peak of 75 percent of total receipts in San Francisco and 66 percent in Los Angeles. Since then, truck receipts have declined to a low of 30 percent in 1952 in the Los Angeles market (Table 13). One reason for this

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1/ Federal-State Market News Service, California Annual Livestock Report, May 1, 1953.

Table 13

TRUCK AND RAIL RECEIPTS OF BUTTER IN SAN FRANCISCO AND LOS ANGELES, 1939-1952
(Thousands of Pounds)

Market	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952
San Francisco														
Rail	36,245	9,697	11,575	21,056	35,580	37,079	36,680	17,002	12,143	12,206	6,950	8,705	17,347	14,010
Truck	n.a.	27,263	26,280	22,989	14,790	12,944	10,513	4,777	17,321	15,745	20,860	19,275	11,039	12,456
Los Angeles														
Rail	49,873	53,418	20,730	28,171	30,546	26,425	34,798	20,979	16,913	14,103	11,314	11,629	22,945	27,022
Truck	n.a.	n.a.	34,283	26,101	13,690	8,763	6,300	1,205	15,006	17,299	22,094	21,439	12,301	11,747

TRUCK RECEIPTS OF BUTTER AS PERCENT OF TOTAL RECEIPTS, 1939-1952

Market	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952
San Francisco	n.a.	74%	69%	52%	29%	26%	22%	22%	59%	56%	75%	69%	39%	47%
Los Angeles	n.a.	n.a.	62	48	31	25	15	5	47	55	66	65	35	30

Sources: Limmer, Ezekiel, Transportation of Selected Agricultural Commodities to Leading Markets by Rail and Truck, 1939-1950.
U. S. Department of Agriculture, Production and Marketing Administration, Dairy and Poultry Market Statistics, 1948-1952.

shift lies in the increasing volume of butter shipped from the Midwest, which, because of distance, tends to be moved primarily by rail. It may be noted in this connection that the proportion of truck receipts has doubled between 1939 and 1950 in the major United States markets.1/

The bulk of truck receipts originated in the Pacific Slope, but truck movement was only slightly higher than rail movement within the Pacific Slope area. Three-fourths of the cheese shipped to California from Oregon moved by rail, and about 60 percent of the Idaho supply arrived by truck (Table 14).

Contrary to the declining trend in the receipts of butter in the two major California markets, receipts of cheese have been expanding. The proportion of truck shipments of cheese has been more stable than that of butter in the 1939-52 period. In the San Francisco market, there has been some recovery in the volume of receipts handled by truck, but in the Los Angeles market, the proportion of truck transportation has continued to decline (Table 15). In Los Angeles, truck receipts were only 18 percent of total receipts in 1952--half as great as in San Francisco--probably reflecting a greater proportion of receipts originating in the midwestern states. Statistics of the major United States markets reveal that truck transportation of cheese has not shown a relative gain in the last 14 years.2/

2. Movement of Cheese

As with butter, a principal characteristic of the pattern of cheese movement to the Pacific Slope is the large volume shipped into California. Table 14 indicates that almost 55 percent of the cheese received in the San Francisco and Los Angeles markets in 1952 originated outside the eleven western states, with less than 1 percent originating in the four Mountain States, 39 percent originating in the Pacific Slope States other than California, and 5 percent originating within the state.

As with butter, Idaho supplied a large proportion--60 percent--of the cheese shipped into Los Angeles and San Francisco from the Pacific Slope States. Also, as with butter, some cheese shipments into California originated in Oregon, Washington, and Utah.

1/ Limmer, Ezekiel, Transportation of Selected Agricultural Commodities to Leading Markets by Rail and Truck, 1930-50. Page 35, Table 24.
2/ Limmer, Ezekiel, op. cit., Page 35, Table 24.

Table 14

ORIGIN OF RAIL AND TRUCK RECEIPTS OF CHEESE
LOS ANGELES AND SAN FRANCISCO MARKETS, 1952
(Volume in Tons)

	Origin										
Transport	Calif.	Idaho	Wash.	Ore.	Ariz.	Utah	Nev.	Pacific Slope	Four Mountain States	Other States	Total U. S.
Rail	242	3,208	583	2,013	0	17	0	6,063	40	15,549	21,652
Truck	1,415	4,551	3	608	0	394	0	6,971	182	414	7,567
TOTAL	1,657	7,759	586	2,621	0	411	0	13,034	222	15,963	29,219

Source: Reports of Federal-State Market News Service, San Francisco.

Table 15

TRUCK AND RAIL RECEIPTS OF CHEESE IN SAN FRANCISCO AND LOS ANGELES, 1939-1952
(Thousands of Pounds)

Market	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952
San Francisco														
Rail	17,869	6,447	7,403	10,276	16,468	11,807	11,420	12,030	12,268	11,726	11,278	9,731	11,459	12,732
Truck	n.a.	11,685	10,284	11,428	5,689	3,852	4,572	5,429	7,549	7,430	5,895	6,886	6,966	7,567
Los Angeles														
Rail	14,389	18,313	11,395	14,060	7,739	11,404	14,505	18,668	19,158	19,719	23,453	23,182	27,040	14,862
Truck	n.a.	n.a.	6,485	7,273	7,371	3,798	3,780	4,916	4,337	2,180	2,740	3,084	5,880	7,037

TRUCK RECEIPTS OF CHEESE AS PERCENT OF TOTAL RECEIPTS, 1939-1952

Market	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952
San Francisco	n.a.	64%	58%	53%	26%	25%	29%	31%	38%	39%	34%	41%	38%	37%
Los Angeles	n.a.	n.a.	36	34	49	25	21	21	18	10	17	12	18	18

Sources: Limmer, Ezekiel, Transportation of Selected Agricultural Commodities to Leading Market by Rail and Truck, 1939-1950.
U. S. Department of Agriculture, Production and Marketing Administration Dairy and Poultry Market Statistics, 1948-1952.

About 76 percent of market receipts in San Francisco and Los Angeles were by rail. This is a higher percentage than for butter. Similarly with regard to butter, rail shipments predominated on the long hauls. Truck hauls were important for intra-California shipments, but very little cheese originating in the Midwest states was hauled by truck.

B. Livestock

It is difficult to obtain a comprehensive picture of the intraregional and interregional movment of livestock because adequate data on truck movements are unavailable. Most of the discussion that follows is based on the analysis of the one percent Waybill Sample of the Interstate Commerce Commission. Since much livestock moves by truck, especially for short distances, the interstate movement of livestock is understated and incomplete. However, the data do give important information on the nature of the movement pattern of livestock.

1. Movement of Cattle and Calves

The Waybill Sample indicates 3.9 million tons of cattle and calves were moved by rail in 1952, of which 10 percent were shipped to the Pacific Slope. (Appendix Table A-7.) Of the 398 thousand tons of cattle and calves received by rail in the Pacific Slope region, 40 percent originated within the region, and about 32 percent originated in the Mountain States, mainly Montana and Colorado. Most of the remainder originated in Texas and the Midwest. About half the tonnage moved within the Pacific Slope States originated in Idaho. Approximately one-quarter originated in Utah, and the balance of shipments were divided about evenly between Oregon and Nevada.

The importance of California as a receiver of cattle and calves is indicated by the fact that over 60 percent of the tonnage originating on the Pacific Slope terminated in California, and a like proportion of the total tonnage terminated on the Pacific Slope from all points in the United States was destined for California markets. Idaho cattle and calves were shipped to every one of the Pacific Slope States. Oregon sent most of its shipments to California and to the Northwest. The bulk of the Utah and all the Nevada shipments went to California.

Relatively complete statistics collected by the California Crop and Livestock Reporting Service are available on the inshipment of cattle and calves into California. Since the information on the state of origin is good, these statistics provide a basis for evaluating the Waybill statistics (Table 16). According to the Waybill data, Idaho is the main source of regional inshipments into California; in contrast the more comprehensive California statistics indicate that receipts from Oregon, Utah, and Nevada are approximately equal to those of Idaho, and inshipments from Arizona are about three times as high. Aside

Table 16

LIVESTOCK SHIPPED INTO CALIFORNIA BY STATE OF ORIGIN, 1952
(Thousands of Head)

State	Cattle and Calves			Sheep and Lambs			Hogs and Pigs
	For Immediate Slaughter	For Stockers & Feeders	For All Purposes	For Immediate Slaughter	For Stockers & Feeders	For All Purposes	For All Purposes
Arizona	194	115	309	41	23	64	7
Idaho	63	43	106	121	142	263	15
Nevada	21	96	117	65	46	111	7
Oregon	13	96	109	83	76	159	4
Utah	56	39	95	125	69	194	8
Washington	0	3	3	6	0	6	0
Colorado	46	35	81	62	11	73	10
Illinois	0	0	0	0	0	0	0
Iowa	0	0	0	0	0	0	387
Kansas	2	28	30	0	0	0	91
Minnesota	0	0	0	0	0	0	5
Missouri	0	0	0	0	0	0	177
Montana	25	72	97	15	37	52	1
Nebraska	9	8	17	0	0	0	1,035
New Mexico	18	65	83	2	32	34	1
North Dakota	0	0	0	0	0	0	1
Oklahoma	1	35	36	0	0	0	9
South Dakota	0	0	0	0	0	0	75
Texas	48	186	234	2	46	48	15
Wyoming	3	16	19	19	32	51	0
Miscellaneous	1	23	24	10	14	24	3
Total	500	860	1,360	551	528	1,079	1,895

Source: California Annual Livestock Report, California Crop and Livestock Reporting Service, May 1, 1953.

from some sampling error, the discrepancy probably measures the extent of the movement by truck. Of the inshipments into California, it is important to note that slightly more than one-third of the total were for immediate slaughter and the remainder were for stocker and feeder purposes. The importance of the state for finishing livestock is increasing. The eleven western states and Texas are the most important source of feeder cattle. The importance of truck shipments in the western region is also pointed up by the fact that a higher proportion of the total terminations on the Pacific Slope originated within the region, according to these data. The comparable figures are about 55 and 40 percent respectively. Another factor indicating the importance of truck hauls in the regions is the relatively large volume of cattle and calves originating in states adjacent to California.

Unfortunately, Waybill statistics have been collected only since 1950, and it is not yet possible to use them for comparing different time periods. The California Crop and Livestock Reporting Service statistics do provide useful information with respect to movement trends, however (Table 16). The great expansion of California meat requirements is indicated by the doubling of inshipments in 1952 compared to the period 1930-39. In 1952, a total of 1,560 thousand head were shipped into the state by truck and railroad.

2. Movement of Sheep and Lambs

Waybill statistics are the best source of information on the interstate movement of sheep and lambs by rail (Appendix Table A-8).[1/] Somewhat less than half of the 565,000 tons of sheep shipped by rail in the United States in 1952 originated in the eleven western states. Volume was about equally divided between the Mountain and Pacific Slope States. High per capita consumption of mutton in the West is indicated by the fact that nearly a quarter of the shipments terminated on the Pacific Slope. The surplus regional balance for sheep and lambs is attested by the 40 percent of the shipments that originated on the Pacific Slope and were terminated elsewhere in the United States, mostly in the midwestern and eastern markets.

A third of the rail shipments of sheep and lambs destined for the Pacific Slope terminated in California, the only state in a deficit supply position. In addition to the considerable intrastate movement in California, substantial shipments of sheep originated in Idaho and Utah and some in Nevada. The major surplus states of the region, Idaho and Utah, each moved about a third of the tonnage terminated on the Pacific

1/ Goats are included in the statistics, but the volume is so small as to be negligible.

Slope. The intraregional rail movement of sheep is extremely high, accounting for over half of the tonnage originated by these states. This may be the reflection of a substantial movement to feedlots in irrigated areas on an in-transit basis. The larger movement into the surplus state of Idaho from nearby states and the very high movement within Utah may probably be accounted for in the same manner.

The interregional movement of sheep and lambs is the result of the surplus supply-consumption balance of the West and the location of the major consuming centers in the East. The bulk of the sheep originated on the Pacific Slope came from Idaho and Utah. But the four Mountain States were the major surplus-producing area in the nation and were the principal source of supply for the midwestern and eastern markets.

The Waybill information indicates that about 70 percent of the shipments terminating in California originated on the Pacific Slope. Crop and Livestock Reporting Service statistics of the volume of movement into California indicate that about 60 percent of the inshipments originated on the Pacific Slope. But when intrastate rail shipments in California are deducted from the Waybill data, the proportions are almost identical.

3. Movement of Hogs

The Pacific Slope is in a very unfavorable deficit position with respect to the supply of hogs. The Corn Belt States are the principal source of hogs in the United States (Appendix Table A-9).

Due to the low volume of rail shipments of hogs originated in the Pacific Slope States, the Waybill data are much more subject to sampling error. Nevertheless, the data indicate, as noted previously, that Idaho is the major source of hogs in the region. Idaho shipments terminate mainly in Washington and Oregon and to some extent in Utah and California, but Idaho shipments account for only 7 percent of the tonnage terminated in the region. The balance of the rail shipments originated in the Midwest.

The unique interregional movement of hogs is brought out clearly by the California Crop and Livestock Reporting Service, which reports that in 1952 only 53 thousand head of the 1,895 thousand head of hogs shipped into California originated on the Pacific Slope and the Mountain States.

The source of inshipments to California lists many states, but the main shipments came from Nebraska, Iowa, and Missouri. Nebraska alone was the source of somewhat more than half the inshipments.

The trend of hog shipments into California is similar to that for cattle and calves. In 1951 and 1952, inshipments were approximately double during the decade of the thirties, indicating the increasingly deficit position of the state in respect to the production of pork (Appendix Table A-9).

4. Movement of Packinghouse Products

With the increasing deficit position of livestock products on the Pacific Slope region, inshipments of fresh and cured meats have grown to substantial proportions. Waybill statistics for 1952 indicate that the vast bulk of rail shipments of packinghouse products terminating in the region originate east of the Rocky Mountains (Appendix Tables A-10 and A-11). In view of the relative economy of rail transportation on the long hauls, it may be assumed that truck movement is of minor importance in the movement of fresh and cured meats and that the Waybill Sample is representative of nearly all the volume of meat products shipped. There is evidence of a backhaul movement of meats in refrigerated trucks from St. Paul to the Northwest in connection with the eastward movement of frozen foods. It is possible that similar interregional movements go on elsewhere in the region.

These commodity movements are consistent with the theory of the geographic location of economic activity in which the denser and less bulky forms of product are produced at greater distances from the centers of consumption. This may explain in part why the volume of cured meats shipped in from the area beyond the eleven western states exceeds the volume of fresh meats. Part of the explanation also may lie in the probability that most of the cured meats are pork products which originate primarily in the states of the Corn Belt.

The interregional trade of the region in livestock and meat products was dominated by inshipments to the state of California. These totaled 1,599 tons of a total of 3,181 tons shipped between the Pacific Slope States. California received 76 percent of the packinghouse products and 56 percent of the livestock shipped to the Pacific Slope States.

C. Potato

1. Interregional Movement of Potatoes

Potatoes account for a significant volume of the movement of agricultural commodities in interregional trade. The western states are an important source of supply of potatoes for the domestic market. Besides being an important source of late potatoes, the Pacific Slope States are the major supplier of early potatoes for the eastern markets.

There is reason to believe that railroads handle the bulk of the interregional trade in potatoes, though truck movement is relatively important in movement between neighboring states. In any case, data on rail movement of potatoes provide a reasonably accurate indication of the magnitude of the interregional movement. In 1952 the ICC Waybill Sample records indicate that over 3.7 million tons or 187,000 carloads were shipped by rail in the United States. The extent of the surplus supply condition of the Pacific Slope in the domestic trade is indicated by the fact that these states originated 46 percent of the rail tonnage of potatoes in the nation compared to terminations of about 13 percent in the region. Volume moving into the Pacific Slope States from the East was negligible. While the four Mountain States originated only 6 percent of the national tonnage shipments, the surplus supplies in these stateswere also large. Altogether, the eleven western states were responsible for well over half the rail traffic in potatoes in the country.

Rail movement of potatoes within the Pacific Slope States is much larger than the movement in dairy and livestock products. Another difference is the high proportion of intrastate movement, accounting for almost half the total volume of rail traffic of potatoes.

Of the rail tonnage moved among the states of the region, one-fifth was originated in California, but about two-thirds was terminated there. Oregon and Washington were the other major receiving states; Oregon and Idaho were the major originators of potato supplies to neighboring states. California and Idaho were the major suppliers from the West and accounted for more than half the tonnage terminated east of the Rockies. Oregon, Washington, and Arizona, the other major producers, shipped to the East about 20 percent of the volume originating on the Pacific Slope.

Analysis of market unloads indicates that the specialized Maine, California, and Idaho potato-growing areas are the major source of potatoes in the nation. Shipments from these states were approximately 45 percent of domestic shipments in the last decade and a half. Main's Aroostook County, accounted for over a fifth of rail shipments in the nation during these years. Shipments from California increased over this period, but those from Idaho declined somewhat.1/

2. Truck and Rail Movement

Information on unloads or receipts at the principal markets indicates relative stability in the proportion of truck unloads

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1/ Limmer, Ezekiel. Transportation of Selected Agricultural Commodities to Leading Markets by Rail and Motor Truck, 1939-50. p. 8.

to the total number—36 percent of total receipts during 1939-45 and 37 percent in 1950. This contrasts with the large growth in the importance of truck transportation for many other agricultural commodities in recent years.1/

The relative importance of truck transportation varies a great deal for the principal markets depending on location and distance between markets and areas of supply. During 1952, for example, 97 percent of potato receipts at Chicago arrived by rail, due to the fact that the important supply areas are located at great distances from the market. In contrast, shipments to New York City were equally divided between the two forms of transport because the proximity of important northeastern areas of supply made truck transportation competitive.

The same variability existed among western markets depending upon similar conditions. The Los Angeles market, adjacent to the famous Kern County potato area, received 61 percent of 1952 unloads by truck. In contrast, truck transportation was responsible for only 41 percent of total unloads in the San Francisco market. The Seattle market, which receives its potato supply mostly from the nearby central Washington irrigated areas, obtained 34 percent of all unloads by truck (Table 17).

A considerable increase in unloads of potatoes occurred during the war period in the San Francisco market, but since then, volume has declined to the prewar level. In Los Angeles, where the population increase has been much greater, there was no slackening in volume of unloads until 1949, when after a slight decrease occurred, there was a levelling off (Table 18). The decline of truck transportation of potatoes was not as great during the war as it was for butter and cheese. Since the war, truck transportation has gained in relative importance in both commodity markets.

In 1952 the Los Angeles market was more dependent upon California sources of supply than San Francisco. About an equal volume of potatoes in each market originated in Oregon, most of it shipped by rail. This source furnished about a third of total unloads in San Francisco (Table 19). Next to California, Idaho was the major supply area for the Los Angeles market, supplying about a fourth of the total. Substantial potato shipments into Seattle came from California and Idaho, though about 60 percent of unloads originated within the state of Washington.

D. Wheat and Wheat Flour

Over the last five crop years, 1948-52, the Pacific Slope produced about 14 percent of the wheat harvested in the United States.

1/ Limmer, Ezekiel. Ibid. p. 10.

Table 17

UNLOADS OF POTATOES BROUGHT IN BY TRUCK OR RAIL AT SELECTED CITIES, 1952
(Carlot Equivalents)

	Origin												
	Pacific Slope												
Market	Calif.	Idaho	Wash.	Ore.	Ariz.	Utah	Nev.	Total	Mountain States	North Central	North East	South	Total U.S.
New York City													
Truck	1	0	3	0	0	0	0	4	0	0	7,182	1,494	8,680
Rail	1,111	1,591	332	98	21	0	0	3,153	13	32	6,853	631	10,682
	1,112	1,591	335	98	21	0	0	3,157	13	32	14,035	2,125	19,362
Chicago													
Truck	2	0	0	0	0	0	0	2	4	364	0	69	439
Rail	1,917	3,465	840	295	248	0	0	6,755	1,033	5,034	148	1,179	14,149
	1,909	3,465	840	295	248	0	0	6,757	1,037	5,398	148	1,248	14,588
Los Angeles													
Truck	7,388	662	79	40	10	207	30	8,416	46	11	0	1	8,474
Rail	1,452	2,899	25	875	0	95	60	5,406	15	21	21	50	5,513
	8,840	3,561	104	915	10	302	90	13,822	61	32	21	51	13,987
San Francisco													
Truck	826	59	80	131	2	0	0	1,098	4	0	0	0	1,102
Rail	598	67	3	842	1	0	16	1,527	8	20	44	13	1,612
	1,424	126	83	973	3	0	16	2,625	12	20	44	13	2,714
Seattle													
Truck	120	17	890	1	0	0	0	1,028	1	0	0	0	1,029
Rail	578	186	948	82	2	0	0	1,796	51	30	82	76	2,035
	698	203	1,838	83	2	0	0	2,824	52	30	82	76	3,064

Source: U. S. Department of Agriculture, Production and Marketing Administration, Unloads of Fresh Fruits and Vegetables, 1952.

Table 18

TRUCK AND RAIL UNLOADS OF POTATOES IN SAN FRANCISCO AND LOS ANGELES, 1939-1952
(Carlot Equivalents)

Market	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952
San Francisco														
Rail	2,189	2,116	2,538	3,576	3,008	3,253	2,551	2,679	2,390	2,286	1,997	1,781	1,952	1,612
Truck	763	786	1,005	938	637	599	913	826	845	959	871	1,026	1,094	1,102
Los Angeles														
Rail	3,790	3,541	3,637	4,572	4,880	4,720	4,612	5,180	4,072	4,397	4,391	3,829	4,681	5,513
Truck	4,784	5,612	5,822	4,429	3,580	4,226	6,017	6,195	6,774	7,406	8,715	10,175	10,213	8,474

TRUCK UNLOADS OF POTATOES AS PERCENT OF TOTAL UNLOADS, 1939-1952

Market	1939	1940	1941	1942	1943	1944	1945	1946	1947	1948	1949	1950	1951	1952
San Francisco	26%	27%	28%	21%	17%	16%	26%	24%	26%	30%	30%	37%	36%	41%
Los Angeles	56	61	62	49	42	47	57	54	62	63	66	73	69	61

Sources: Limmer, Ezekiel, Transportation of Selected Agricultural Commodities to Leading Markets by Rail and Truck, 1939-1950. U. S. Department of Agriculture, Production and Marketing Administration, Dairy and Poultry Market Statistics, 1948-1952.

Table 19

RAIL SHIPMENTS OF WHEAT FROM THE PACIFIC NORTHWEST 1/
TO OTHER REGIONS OF THE UNITED STATES 2/
CROP YEARS 1946-47 THROUGH 1952-53 3/
(Thousands of Bushels)

From Pacific Northwest To	1946-1947	1947-1948	1948-1949	1949-1950	1950-1951	1951-1952	1952-1953
North Atlantic	6	12	16	4	8	2	n.a.
Southeast	538	81	14	1	0	0	n.a.
Midwest	6,843	1,753	984	1,016	931	1,208	n.a.
Western States	1,497	848	618	550	304	481	n.a.
California	2,683	1,895	977	747	735	724	n.a.
Other States	64	9	2	0	2	4	n.a.
Total	11,631	4,598	2,689	2,318	1,980	2,419	1,703

1/ Washington, Oregon, and Northern Idaho.
2/ Data from the Pacific Northwest Grain and Grain Products Association report of October 6, 1953, and U. S. Department of Agriculture, Production and Marketing Administration, Pacific Northwest Wheat Market Summary.
3/ Year beginning July 1.

Wheat production is distributed unevenly over the region, with the bulk of the crop--87 percent in 1952--grown in the Northwest. Seventy percent of the regional wheat crop was raised in the specialized Palouse wheat-growing area of Oregon, Washington, and northern Idaho. In the last five years this region has produced about 10 percent of the total United States wheat supply and the bulk of the white wheat.1/ In 1949, three-fourths of the crop in the Palouse area was a soft white variety used for milling soft wheat flour for the pastry, cake, and cracker trade.2/ Southern Idaho and Utah produced a fifth of all the wheat in the region, and two-thirds of the hard red wheat grown in the region in 1952. California, the major consuming state in the West, produced only 8 percent of the Pacific Slope supply and, therefore, was in a predominantly deficit position.

1. Interregional Rail Movement

Wheat and wheat flour are commodities that move primarily by rail. The 1952 ICC Waybill Sample statistics are probably a fair indication of the magnitude of interregional domestic wheat movements (Appendix Table A-13).

All but a small proportion of the rail shipments of wheat originating on the Pacific Slope was moved to points in the region. Nearly a fifth of the wheat tonnage shipped by rail in the nation originated in the eleven western states, about equally divided between the Pacific Slope States and the four Mountain States. The eleven western states originated less than 11 percent of the flour tonnage of the nation and the Pacific Slope States accounted for three-fourths of the flour shipped by the eleven western states (Appendix Table A-14).

The Pacific Slope States received almost no wheat and flour shipments from the eastern part of the United States. Most of the Colorado shipments moved east, and half the Montana wheat shipments moved into the Pacific Northwest and thence into the export trade. Some Colorado flour was shipped to Arizona, but the bulk moved east. About half of the flour from Montana moved to the Pacific Slope. Most of the flour shipped to California originated in Oregon, Utah, and Idaho.

A high proportion of the wheat and wheat flour tonnage of the Northwest was destined for the export market; this accounts for the relatively large terminations in the area. The high volume of Washington shipments to Oregon probably moved into the export trade.

1/ Soft wheat, both red and white, is also produced in the Ohio River Valley, southern Illinois, northern Missouri, Pennsylvania, and New York.

2/ Brief presented by Pacific Northwest Grain and Grain Products Association, Portland, Oregon, on a revision of freight rates upon grain and grain products, October 6, 1953, p. 2.

While wheat and flour exports were rising to unprecendented levels, shipments from the Northwest to the domestic market underwent a sharp decline. Rail shipments dropped from 11.6 million to 1.7 million bushels between the 1946 and the 1952 crop years (Table 19). Shipments to the Southeast all but vanished; proportionately larger movements have continued to California and other western states. Rail movements to the Midwest have continued, but at a third of the former volume. However, midwestern receipts from the Northwest were still as large as receipts in all the western states in the 1951-52 crop year.

2. Intercoastal Movement

Movement of wheat and wheat flour in the intercoastal trade from the Pacific Northwest to Atlantic ports was resumed in 1945 after the suspension during the war years. In 1946 a peak volume of 1.4 million bushels of wheat equivalent, of which nearly all was shipped to North Atlantic ports (Table 20).

Thereafter the intercoastal volume declined continuously from 1946. The series of freight rate increases of recent years began July 1, 1946.1/ Rate increases by the water carriers were obtained about the same time as those secured by the railroads. During 1950-52 intercoastal shipments averaged a little over 100 thousand bushels, wheat equivalent.

It might be noted that the decline in the volume moved in the intercoastal trade is not peculiar to the wheat trade. During the same 1950-52 period the total cargo tonnage originated and terminated in San Francisco Bay ports averaged 1.2 million net tons compared to the average annual 2.2 million net tons moved during 1934-38, a 46 percent decline. Between the two periods, the entire intercoastal trade declined 39 percent. Mounting costs of operation, recurring labor difficulties, and the excessive capital investment are believed responsible for the decline in intercoastal shipping.2/

A flourishing movement of bulk wheat from Puget Sound and Columbia River ports to California used to exist. As much as 250 thousand tons were shipped in some years. Loading and unloading costs were low, and rates competitive with rail transportation could be established. Fundamental to the question of the Pacific Coast wheat trade to California is the Hoch-Smith Grain Order of the Interstate Commerce Commission, a decision

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1/ Pacific Northwest Grain and Grain Products Association. A Report Covering a Survey on the Matter of Rates and Movement of Grain and Grain Products Within and From the Pacific Northwest to All Consuming Markets. September 18, 1952, p. 5.
2/ Ibid., p. 8.

Table 20

RAIL AND WATER SHIPMENTS OF WHEAT FLOUR FROM THE PACIFIC NORTHWEST TO EASTERN AND SOUTHEASTERN DESTINATIONS 1/
Calendar Years 1945-1951
(Thousands of Bushels, Wheat Equivalent)

Method of Transportation	Shipment To	1945	1946	1947	1948	1949	1950	1951	1952
Rail	North of Ohio River	8,557	5,775	3,020	1,015	735	545	371	498
	South of Ohio River	923	947	438	197	232	216	126	158
	Total Rail	9,480	6,722	3,458	1,212	967	761	497	656
Water	North Atlantic	391	1,336	672	36	55	74	67	92
	South Atlantic	28	16	13	1	8	42	42	24
	Total Water	419	1,352	685	37	63	116	109	116
Total Shipments		9,899	8,074	4,143	1,249	1,030	877	606	772

1/ Pacific Northwest Grain and Grain Products Association report of October 6, 1953.

that makes all-rail and rail-water rates identical. The all-rail rates were also blanketed to include many interior points beyond the ports.[1] Unless some important change occurs affecting costs of water transportation, it would appear unlikely that wheat and wheat flour will move in the coastwise trade due to the rate situation created by this Order.

In the postwar years the wheat loan rate under the government price support program is said to have favored southern Idaho over the Northwest in shipping to the California market. This is given as one of the reasons why shipments to California have not been resumed with the same volume during the postwar period.[2] There are indications that truck haulage to California may also have become an important factor in competition for the southern Idaho grain trade. In the crop years 1941-1950, the Grain Inspection Service of the United States Department of Agriculture records show no barge movements of wheat to California and only 81 carloads in the 1951 crop year, and 109 carloads in the 1952 crop year. All these deliveries were made at San Francisco and Stockton (Table 21).

3. Exports from the Pacific Northwest

A large proportion of the wheat and wheat flour produced in the Pacific Northwest has always been exported to foreign markets or other regions. In the twenties, exports approximated half of production.[2]

The market was nearly shut off in the middle thirties, but recovered substantially in the immediate prewar years. Exports were again resumed on a large scale with the export of 55 million bushels from the 1946 crop. Exports have been maintained at a high level at an average of approximately 70 percent of production (Table 22). During the postwar period of world wheat shortages, a large proportion of northwest export shipments went to the Asiatic countries, primarily Japan, India, and the Philippines.[3]

4. Truck and Rail Movement to California

For all practical purposes, trucks and railroads moved all the wheat to California in the period 1941-52. Los Angeles and San Francisco received 80 to 90 percent of all inspected wheat

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1/ San Francisco Bay Ports Commission. A Report on Pacific Coastwise Shipping with Special References to the San Francisco Bay Ports Area. June 1953, p. 21.

2/ Pacific Northwest Grain and Grain Products Association, Op. cit. Appendix B, Sheet 3.

3/ Ibid., p. 34.

Table 21

RECEIPTS OF WHEAT AT INSPECTION POINTS IN CALIFORNIA
BY TYPE OF CARRIER
Crop Years 1951-1952 and 1952-1953[1]
(Carlot Equivalents)[2]

Market	Method of Transportation	1951-1952	1952-1953
Los Angeles	Rail	2,577	2,270
	Truck	12	17
	Barge	0	0
		2,589	2,287
San Francisco	Rail	1,142	1,070
	Truck	532	996
	Barge	81	80
		1,746	2,146
Petaluma	Rail	46	22
	Truck	81	103
	Barge	0	0
		127	125
Sacramento	Rail	452	77
	Truck	21	31
	Barge	0	0
		473	108
Stockton	Rail	345	78
	Truck	42	172
	Barge	0	29
		387	279
Total California	Rail	4,562	3,517
	Truck	679	1,319
	Barge	81	109
		5,321	4,945

1/ Year beginning July 1.
2/ One carlot equals 1,800 bushels of wheat.

Source: United States Department of Agriculture, Production and marketing Administration, Annual Summary of Grain Inspections, for each year.

Table 22

PROGRAMMED DEVELOPMENT OF MAJOR BUREAU OF RECLAMATION CONTINUING IRRIGATION PROJECTS OR DIVISIONS, 1952-1959 AND ULTIMATE PROGRAM
(Thousands of Acres)

		1952	1953	1954	1955	1956	1957	1958	1959	Ultimate Program
Central Valley,	N	9.3	12.3	15.1	19.2	22.4	25.0	62.8	212.7	465.4
California	S	533.1	548.4	572.6	614.2	729.5	770.0	796.5	808.8	1,181.1
Columbia Basin,	N	87.8	154.9	218.2	292.9	374.1	439.4	498.7	556.3	1,095.2
Washington	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Gila Basin,	N	20.1	31.9	49.5	78.8	87.8	87.8	87.8	87.8	92.7
Arizona	S	1.7	11.6	13.2	15.2	15.2	15.2	15.2	15.2	22.3
All-American Canal,	N	60.6	70.2	74.8	74.8	74.8	74.8	74.8	74.8	86.1
Arizona-California	S	425.0	425.0	425.0	425.0	425.0	425.0	425.0	425.0	425.0
Minidoka-Northside,	N	5.1	7.2	17.2	27.2	37.2	60.8	65.8	69.5	69.5
Idaho	S	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Palisades,	N	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Idaho-Wyoming	S	0.0	0.0	0.0	0.0	0.0	0.0	650.0	650.0	650.0
Total 6 Projects	N	182.9	276.5	347.8	492.9	587.3	687.8	789.9	1,001.0	1,808.9
	S	959.8	985.0	964.8	1,054.4	1,169.7	1,210.2	1,711.8	1,899.0	1,693.4

Note: N = Full irrigation supply. S = Supplemental irrigation supply.

Sources: Bureau of Reclamation, Annual Report of the Secretary of the Interior for the Fiscal Year Ended June 30, 1952. Data refer to fiscal years.
Data for the Columbia Basin Project from the Bureau of Reclamation, Ephrata, Washington, report of June 1953.

receipts in California. Receipts at Los Angeles were almost entirely by railroad. Truck receipts were of considerable but fluctuating importance in San Francisco and other northern California markets. A trend of increasing truck movements has been in evidence in the postwar period. Truck volume has risen from less than 5 percent of rail volume in 1941 until it equalled one-third in 1952 (Table 21).

E. Pattern of Frozen Fruit and Vegetable Movements

Data on the volume of frozen fruits and vegetables transported in the United States, on the pattern of traffic flow, and on the media of transportation used are more limited than for the commodities previously discussed. As a result, the amount of material developed for this report on the movement of frozen fruits and vegetables is relatively small. For this reason, data on movements of these commodities are included later in the report under the commodity discussions which follow.

Section VI

THE COLUMBIA BASIN

A. Selection of an Area for Intensive Study

One of the aims of the study was to examine the transportation problems of a specific expanding agricultural area. Acreage and production changes in the agricultural areas of the western states were examined statistically for the purpose of locating and delineating large and rapidly growing agricultural areas. The analysis revealed that a substantial expansion occurred over the last two decades in a number of agricultural areas in the production of certain crops and livestock.

Though important, instances of increasing intensity and shifts in the production of single crops or livestock products are not suitable for a study of broad transportation problems associated with an expanding agriculture. With few exceptions, expansion in production of a single crop or livestock product is superimposed upon an existing agricultural economy. Marketing facilities are usually well developed, though some specialized facilities may be added to handle abnormal growth in the volume of marketings. Of most importance is the fact that transportation and associated marketing facilities are usually developed in substantial degree.

For the purposes of this project, the analysis should be based upon a diversified area economy. By focusing attention on rapid expansion of a diversified and multi-product agricultural economy, emphasis is shifted to areas growing as a whole and in the process of experiencing unusual agricultural development.

An area of expanding agricultural production may result from an increase in acreage under cultivation and/or a rising intensity of production. In a growing region such as the West, an extensive and an intensive gain frequently go together, and attention needs to be focused on the rate of growth of a given general area. As a further condition, agricultural output in the area selected should demonstrate some prospects for growth in relation to the base from which the expansion originates. The two major criteria for the selection of expanding areas of agricultural production are (1) high prospective rate of expansion and (2) significant volume of production.

These criteria of selection are satisfied by areas in which new irrigation is programmed, with a resulting increase in acreage and/or more intensive production. Unusual growth is a reflection of the fact that peak development has not been achieved. The number of localities that can qualify is small. The choice is reduced to the larger projects now under construction, authorized, or planned by the Bureau of Reclamation of the United States Department of the

Interior. A number of these projects have a potential for large and rapid growth, considering available irrigable acreage and prospects for development.

The criteria established for selection among these areas are (1) a large prospective growth in production, with possibly a recent history recording substantial expansion, (2) a present or potential large volume of production, and (3) a diversified agricultural economy. These conditions are the basis for posing important problems associated with the development of an adequate and economical transportation system with well-located facilities providing for the transportation and marketing of agricultural products and for other essential community services.

The larger projects of the Bureau of Reclamation were examined with a view to their suitability for a study of transportation problems associated with expanding agricultural areas. Detailed data on these projects are included in Appendix B.

Historically, irrigation development by private individuals, commercial interests, and mutual groups has been very important. Irrigation development of the Bureau of Reclamation has been large in the past, but it is interesting to note that the bulk of the irrigation in the West has been accomplished by private interests with varying degrees of support from state and local governments. Private projects have been developed for the most part from ground water sources. As a general rule, private enterprise has irrigated smaller tracts, and projects with lower cost of irrigation development than those irrigated by public agencies. As time passes, ground water sources will become less available, only the more expensive projects will remain, and the relative cost of developing land for irrigation will increase. Irrigation by private interests undoubtedly will continue to be important, but public agencies may be expected to fulfill an important role in future development of irrigation in the West. These facts indicate that the irrigation works of the Bureau of Reclamation will become relatively more important in the future.

Of the 967,500 acres of full irrigation programmed between 1952 and 1959 on the Pacific Slope (Table 22), the principal addition is planned in the state of Washington by the development of 489,000 acres, nearly all in the Columbia River Basin. Another 286,100 acres of full irrigation are planned in California, most of it in the Central Valley Project; 78,900 in Idaho; 67,700 in Arizona; and 16,000 in Utah. By 1959 the two major projects under way in the western states, the Columbia Basin and the Central Valley projects, will add 644,500 acres, or nearly 70 percent of the full irrigation planned in the Pacific Slope States.

A desirable condition to the selection of an expanding agricultural area for study of transportation problems is that the extension of irrigated acreage would have a very profound impact upon the

economy of the area, indicated by a greater percentage of new than of supplemental irrigation. This consideration eliminated the Palisades Project, the Minidoka Project, the Gila Basin Project, and the All-American Canal Project. The Central Valley Project is a planned addition to an area already comprising a complex agricultural and industrial economy. A considerable portion of the program involves the addition of supplementary irrigation. While the addition of new irrigated land appears large, it is not a very large increase over the amount of lands now irrigated. Moreover, existing transportation and marketing facilities appear to be able to handle the increase in agricultural products resulting from the extensions of irrigation planned, because the rate of development is not great and the growth will occur within, or immediately adjacent to, an existing commercial area.

The remaining area, the Columbia Basin, was therefore selected for a study of the transportation problems associated with a specific expanding agricultural area. The programmed expansion of irrigation there is very large; the land is practically desert and is now used at a low level of intensity. Commercial enterprises serving agriculture are few and are meagerly developed. The Columbia Basin provides the best opportunity for study of transportation problems of a rapidly expanding and potentially diversified agricultural economy.

B. The Present Economy of The Columbia Basin

The Columbia Basin is located in the western portion of the Big Bend of the Columbia River in Grant, Adams, and Franklin counties (Figure 6), in the central portion of the state of Washington. The topography is characterized by rolling plains, undulating uplands, and coulees. It is a sagebrush-covered semi-desert, with an annual precipitation of about eight inches, a moderate climate, a long growing season, and mild winters. The area is especially well suited to the production of fruits, vegetables, sugar beets, and potatoes.

The land in the Basin is used at present for an extensive agriculture of dry farming and ranching. Production of wheat, cattle, and sheep are the major farm enterprises. Irrigation of the better lands will completely change the economy of the area, by increasing the intensity of use.

In 1950 the Basin had a population of 30,230. Of the 21,700 nonfarm residents, four towns, Pasco, Ephrata, Moses Lake, and Soap Lake, had 19,630 persons. Pasco, the largest community, had a population of 10,280.[1] There are indications that recent developments have resulted in a considerable population influx. Moses Lake is the fastest growing center; it had a population of 2,680 in 1950 and in April 1952 it was estimated to have grown to 13,240.[2]

1/ Bureau of Reclamation, Indications of Business and Industrial Development That Will Result from the Irrigation of the Columbia Basin Project.

2/ MacConnell, J. D. and W. R. Odell, Moses Lake--A New Frontier, p. 29.

According to the 1949 census, the three counties of the Columbia Basin included 1,482,000 acres of cropland, or about 19 percent of the total cropland in the state. All except 20,000 acres were devoted to dry farming and ranching; thus irrigation development in the Columbia Basin starts from a small irrigated acreage.

Of the 692,000 acres reported in crops in 1949, 663,000 acres were used for winter and spring wheat and the remaining acreage included hay, potatoes, truck crops, and small grains. Truck crops accounted for 1,446 acres, and 1,029 acres were devoted to fruits and nuts. Over half the land was range pasture supporting the production of livestock. Over the twenty-year period, 1929-49, the number of sheep and lambs and milk cows, and the volume of whole milk sold, declined sharply. Chicken production declined but the production of turkeys and cattle showed some increase.

1. Transportation Facilities

Rail Network. Four transcontinental rail lines serve the Columbia Basin. The lines of the Great Northern Railway, the Northern Pacific Railway, and the Chicago, Milwaukee, St. Paul, and Pacific Railroad cross the area, and the Union Pacific Railroad system serves the southernmost points of the Basin. In addition, the Spokane, Portland, and Seattle Railway system serves some parts of the area. The rail network, providing rail service not more than twenty miles from all producing agricultural shipping points in the Basin, appears to be basically adequate at the present time (Figure 6).

Although it is apparent that the rail network can meet current requirements, this may not be true when the Columbia Basin is developing rapidly. While the basic rail pattern appears adequate, there will develop needs for additional feeder lines, spur tracks, and other facilities to meet specific needs in particular areas. However, because of the presence of five rail lines, together with aggressive motor carrier companies, the favorable competitive situation in the Columbia Basin will tend to bring required transport facilities into the area when needed.

The rail lines and motor carriers are anxious to develop business in the area and are watching developments very closely. They are ready to build facilities when warranted, but their basic problem is where and when to make capital investments.

An illustration of the willingness and ability of the rail carriers to provide facilities is the fact that both the Northern Pacific Railway and the Chicago, Milwaukee, St. Paul, and Pacific Railway have built trackage into the sugar beet refining plant of the Utah-Idaho Sugar Company near Wheeler.

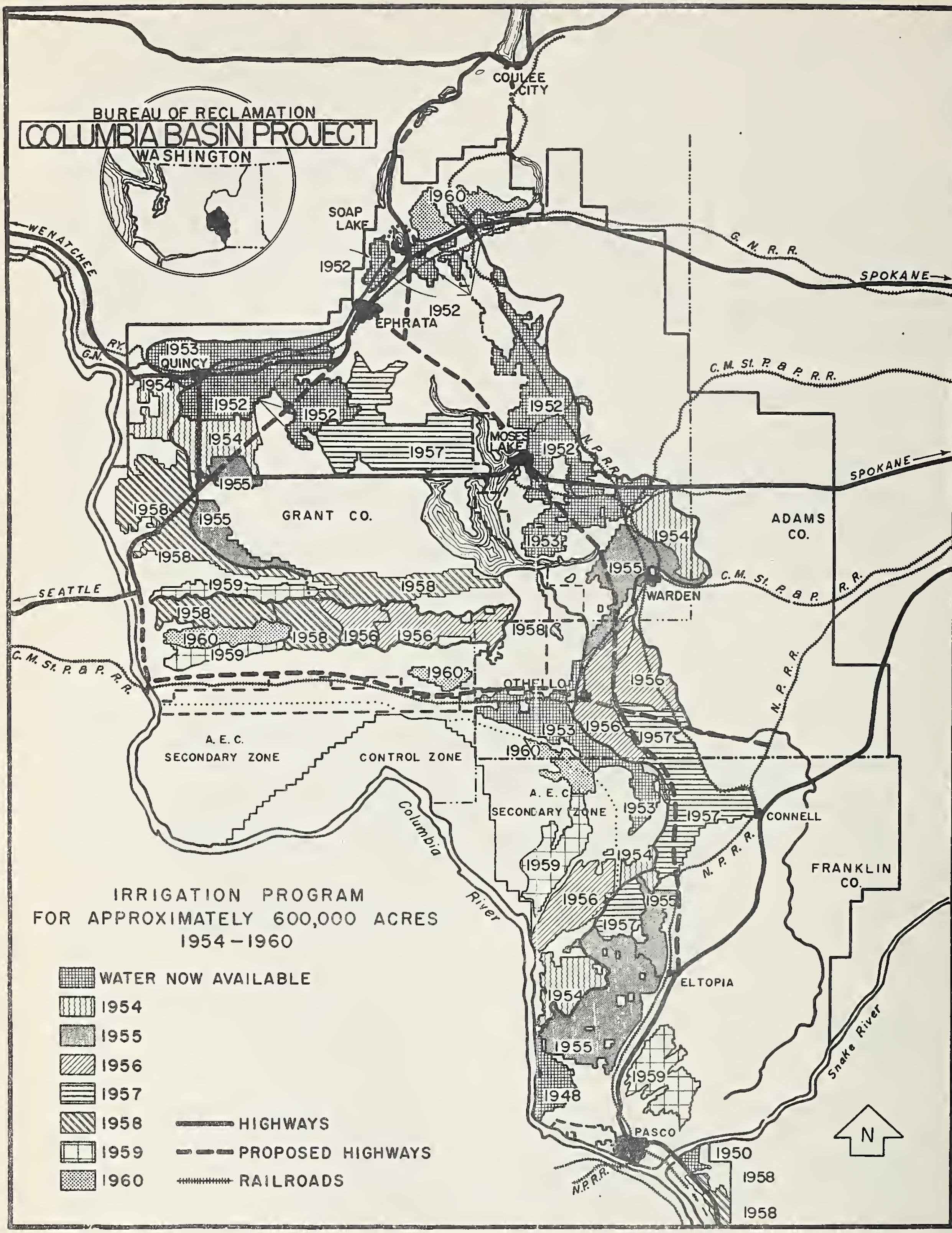

Figure 6

COLUMBIA RIVER BASIN

C-657-7

Because the rail lines are actively competing for business in this area and because it appears that the present rail pattern has a capacity for substantial expansion, detailed study of the adequacy of the basic rail network does not appear to be warranted. However, the carriers are vitally interested in a measurement of transportation requirements as the Columbia Basin develops. Specific data on the extent and rate of growth of the transportation needs of the area would assist the carriers in making sound capital investments.

State Highway Network. The state of Washington is confronted with the same highway problem that is facing all of the West and the nation. There have been large increases in automobile and truck registrations with little increase in highway mileage to carry the increased load. Auto registrations in Washington have risen from 473,000 in 1940 to 783,000 in 1951, an increase of 66 percent; for the same period, truck registrations rose from 88,000 to 164,000, an increase of 86 percent. Surfaced mileage of state highways rose only 100 miles--from 6,200 to 6,300 miles. Although capacity of the state highways has been increased during this period, by the widening and improving of existing highways, there has been little change in the basic highway system. The great increases in traffic load which the truck and automobile registrations indicate are taxing the capacity of many parts of the highway system.

The Columbia Basin highway network is also shown in Figure 6. Although present traffic flows indicate that no serious bottlenecks have occurred, future growth of the Basin will require additional state highways. The Washington State Highway Commission is well aware of the problem and is making plans to meet the expanding requirements of the area for highways. Projected highways through the Basin are indicated in Figure 6.

County and Farm Roads. The existing county and farm road network in the Columbia Basin is relatively meager, but appears to be adequate to meet present requirements. As the Basin develops, however, more county and farm-to-market roads will be needed.

Local road construction programs are planned and funded to the middle of 1954. There were 191 miles of new farm-to-market roads under construction in 1952 designed to meet the projected needs of the area. A state bond issue providing $5,000,000 and federal funds in the amount of $700,000 are financing this program.

The provision of adequate roads is costly, and the ultimate road needs of the Basin will require relatively large financial outlays. State and local authorities are well aware of the financial problem involved in keeping the road-building program in line with the development of the Basin. However, because

of the financial burden involved, provision and maintenance of adequate local roads is a potential problem when the Basin area is developing rapidly.

Airports. There are two commercial airports in the Columbia Basin area which are served by scheduled airlines. Regular service is available from Ephrata and Pasco for passengers and air freight. It is not anticipated that there will be any significant impact on airports or airlines from air freight traffic generated by developments in the Columbia Basin. The commodities expected to be produced are not suited to air shipment and the amounts of air freight that may develop from supporting economic activities probably will remain small.

Inland Waterways. With improvement of navigation on the Columbia River, facilities are now available for barge transportation between Pasco and the Pacific Coast. Completion of the Bonneville Dam and the opening of its lock in 1948 made possible a substantial growth in river transportation. Prior to the construction of locks at the McNary Dam, most of the river traffic could not move beyond Umatilla; but as improvements were made, shipment by barge could be made to and from Pasco. When the McNary and the Dalles projects are completed, navigation will be substantially improved, thus increasing the potential capacity of this inland waterway.

If plans for the John Day Dam on the Columbia River, and Ice Harbor, Lower Monumental, Little Goose, and Lower Granite Dams on the Snake River are completed, navigation will be possible as far as Lewiston, Idaho. Completion of the Priest Rapids Dam on the Columbia and the installation of a lock in Rock Island Dam would extend river traffic to Wenatchee, Washington.

Several barging companies are actively engaged in inland waterway operations. The capacity of the Columbia River as an inland waterway is high, offering an alternative form of transportation to parts of the Columbia Basin. This fact may have substantial influence on the development of transportation services in the area.

Pipelines. At the present time, only one pipeline serves points near the Columbia Basin. This is a refined petroleum products pipeline running from Salt Lake City to Pasco and Spokane. A new refined products pipeline from Billings, Montana, to Spokane is now under construction.

Two applications now pending before the Federal Power Commission may result in gas pipelines to serve interior Washington points as well as the principal coastal cities. The West Coast Transmission Company, Ltd., is seeking the approval of the Federal Power Commission to build a pipeline from the Peace River

(Canada) fields south to Seattle, Vancouver (Washington), and Portland. The proposal provides for the ultimate construction of spur lines to serve Trail, Spokane, western Idaho, Hanford, and Yakima.

The proposal of the West Coast Transmission Company, Ltd., has been approved by the Alberta Conservation Board and by the Board of Transport Commissioners in Canada. Only approval of the Federal Power Commission is lacking.

The Pacific Northwest Pipeline Company has an application pending before the Federal Power Commission for approval to construct a gas pipeline from the Four Corners area of New Mexico to the Pacific Northwest via Salt Lake City.1/ This company proposes to run its main line from Salt Lake City to Portland, Seattle, and Vancouver, reaching the Columbia River west of Umatilla. Spur lines would be constructed serving Hanford, Yakima, Spokane, and intermediate points.

The addition of either one of these pipelines would have important effects on the economy of eastern Washington and the Columbia Basin area. The availability of natural gas would significantly influence transportation patterns in the area because of the added potential for industrial development. One important direct effect on the Columbia Basin would be the possible location of fertilizer-processing plants in or near the Basin.

2. Marketing Facilities

At the present time marketing facilities are relatively few in numbers and meagerly developed compared to the organization and development that will eventually be required in the Columbia Basin. Marketing facilities will have to develop quickly to keep pace with the rapid extension of irrigation now under way.

In the process of growth, marketing costs, including costs of transportation and handling, will need to be kept as low as possible to preserve and enhance the economic advantage of the Basin. The problem of developing an efficient marketing system will be considered in more detail in later sections of the report. The purpose at this point is to inventory the marketing facilities existing in the Basin to indicate the stage of development from which the marketing economy is proceeding. It must be recognized that the marketing structure is extremely dynamic and subject to change. The inventory given here represents a cross-section view of the local economy in the Spring and Summer of 1953.

1/ Docket G-1429.

Grain Elevators. Facilities for handling small grains--wheat, barley, rye, oats--are located on railroads at the following points:

> Quincy District--Quincy, Ephrata, and Trinidad.
>
> East District--Wilson Creek, Stratford, Buff, Wheeler, Schrag, Warden, Roxboro, Othello, Cunningham, Hatton, and Shano.
>
> South District--Connel, Mesa, Eltopia, and Pasco-Kennewick.

Storage Warehouses for Potatoes and Onions. Storage cellars are maintained on the larger farms, some of which may store potatoes and onions for farms with smaller acreages. Washing and sorting is usually done in connection with potato storage cellars. In onion storage warehouses, temperature is controlled and sorting and hulling undertaken.

Wholesale storage facilities for potatoes and onions are located at Quincy-Winchester, Moses Lake, Pasco-Kennewick, and Othello. Surplus potatoes are shipped to Seattle and the East.

Facilities for Handling Sugar Beets. Dumps where sugar beets are received from farmers, weighed, and sacked are located at Wheeler, Quincy, and Glade (near Pasco).

Sugar beets from the dump at Quincy are shipped by rail to the sugar refinery at Wenatchee, and those from the dump at Glade are shipped by rail to the Utah-Idaho Sugar Company factory at Toppenish. A new plant of the Utah-Idaho Sugar Company has been built near Wheeler. The Amalgamated Sugar Company has plans for a plant near Quincy.

Small Seeds, Dry Beans, Dry Peas, Sage. Small leguminous seeds are received and cleaned at Moses Lake and are received at Quincy, but not cleaned or sorted. Dry peas and dry beans are received and cleaned at Quincy.

Sage handling facilities now are concentrated at Moses Lake, where the industry is best established.

Truck Crops. A freezing plant located at Wenatchee is becoming heavily dependent upon supplies from the Columbia Basin. Production contracts for sweet corn, green beans, green peas, and asparagus have been let in the Quincy-Wenatchee area over the last four seasons and during the last two seasons in the Moses Lake area. The crop is harvested by the company and hauled to the plant for freezing. No storage facilities are maintained in the Basin producing areas. Freezing facilities undoubtedly will be established in the Basin in the near

future if prices remain favorable and volume of local production can be sufficiently increased.

Cold storage and warehousing facilities exist at Pasco, but no freezing facilities are established. All frozen foods needed are shipped in. Packing, sorting, storage, and freezing facilities are available at the nearby Yakima area for truck crops, fruits, mints, hops, and juices; these facilities can be used in the early stages of the production of these crops.

Livestock Handling Facilities. Small slaughterhouses, also doing custom slaughtering, are in operation at Moses Lake, Wilson Creek, and Pasco. These handle cattle and some hogs. No curing is done at these plants. Cold storage lockers at Pasco-Kennewick cure, wrap, pack, and store meat on a custom basis.

Livestock auctions and sales yards are located at Coulee City, Moses Lake, and Pasco. The Pasco Central Stockyards are used periodically for auctions of feeder calves, breeding cattle, and other stock. These good-sized stockyards are used for cattle in transit to slaughterhouses at Seattle and Spokane.

A farm turkey dressing plant is located at Moses Lake. A new poultry processing plant has been built at Kennewick. Eggs are shipped in and hatched at a cooperative plant located at Pasco.

Facilities for Handling Milk Products. Insufficient milk is produced for local requirements in the Columbia Basin; bottled milk, mostly in paper containers, is shipped in from Spokane, Portland, Walla Walla, Yakima, Wenatchee, and Seattle. In the Ephrata area, ice cream is shipped in from Snohomish. Refrigeration storage is available at Moses Lake, Quincy, Ephrata, Warden, and Pasco. The policy of the milk companies appears to be to build up a local fluid milk market to provide an outlet for eventual production in quantity. Farmers are encouraged to develop a Grade A milk supply. In the meantime pasteurizing and bottling facilities outside the Basin, mostly in Spokane, are being utilized.

C. The Impact of Irrigation

Irrigation developments in the Columbia Basin will bring substantial changes in the economic pattern described above.

1. Irrigation Development and Expected Land Utilization

As presently planned, the irrigation system in the Columbia Basin will irrigate 1,095,200 acres (including rights-of-way and other nonirrigation uses). Scheduled for irrigation development during the period 1952-59 are 556,347 acres. Deferred for

development beyond 1959 are 538,853 acres. Some of these lands are held by the Atomic Energy Commission and by military installations, and some have been withdrawn from the project at present by the owners.[1]

According to the Bureau of Reclamation's 1959 program, water will be made available to an average of 70,000 additional acres each year, but the development of farms will proceed more slowly. Actual irrigation on these farms is expected to proceed at an even slower pace, so that mature development[2] of agriculture is not expected to be achieved on the first 600,000 acres until about 1963. Assuming the remainder of the Basin to be developed at the same rate, mature development of the million-acre program probably will not be reached until 1975.

With the development of irrigation in the Columbia Basin, it is expected that the economy of the area will shift from dry farming based upon wheat production to the type of agriculture associated with western irrigation: hay and cultivated pastures will be the bases for heavy production of livestock, and acreage of truck and fruit crops will become much more important. This will represent a major shift in the type of agriculture in the Columbia Basin.

In the early stages of development, cash income is urgently needed by farmers, in spite of the fact that considerable credit for land, equipment, and development can be obtained from the Bureau of Reclamation and the Farmers' Home Administration. During this period, cash crops such as wheat, potatoes, and sugar beets, representing a short-term investment, will tend to be produced. Later on, while potatoes and sugar beets will continue to be emphasized, other products requiring a long-term investment, such as dairy products and fruits, will become of greater importance.

2. Prospective Agricultural Production Pattern

Two estimates have been made of the anticipated pattern of land utilization as the Columbia Basin shifts from a semi-desert to a fertile irrigated area: In the early forties, studies of the prospective land utilization pattern were made cooperatively between the Bureau of Reclamation and other interested agencies in the Northwest[3] in the Columbia Basin Joint

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1/ Brough, O. L., et al, Estimated Fuel Requirements for the Potential Processing of Agricultural Products of the Columbia Basin Irrigation Project. p. 35.

2/ The concept of "mature development" has reference to the time when the adjustments of the development period culminate in an equilibrium in the land use pattern of competing crops and pasture.

3/ Types of Farming, Columbia Basin Joint Investigation Problem, United States Department of the Interior, Bureau of Reclamation, Washington, D. D. (1945).

Investigation. The estimates were based on study of the soils, climatic conditions, experience on irrigation projects in the Northwest, and long-run commodity price relationships. Since that time, the Bureau of Reclamation has estimated prospective land utilization, production tonnage, and crop values for the first 600,000 acres, and for the entire million-acre project, assuming mature development of the agricultural economy. The recent (1952) estimates are much more detailed soil studies of the region, based on the production experience in a number of comparable irrigation projects in the Northwest, taking into account similar soils and climatic conditions. The recent studies presumably do not give explicit consideration to the effects of prospective price relationships on the future land-use pattern.

The two estimates are in close agreement with respect to the probable acreage used for grains, but in the 1952 estimates the acreage expected to be devoted to hay and pasture is lower and the acreage to field crops, truck crops, and fruits is greater (Table 23).

According to the new estimates, the percentage of forage acreage is 53.2 percent of the total acreage as opposed to 62.5 percent in the earlier estimate. Sugar beets and potatoes are expected to be about twice as important as in the earlier estimate. Under mature development, the acreage devoted to small grains is expected to be about 15 percent, although under dry farming conditions there was nearly complete planting to wheat and other grains. In addition, under the new conditions nearly 30 percent of the total acreage is expected to be used to grow other field crops, as well as vegetables and fruits previously of negligible proportions.

The expansion of production will be gradual in the direction of these estimates. In the earliest phases of development, as mentioned, the need for cash will be shown in heavy plantings of crops that can give a quick return. Market conditions may affect production of these crops erratically from year to year. The production of truck crops may be affected substantially by the timing and the extent to which contracts are issued by processors. This will be especially true for such crops as green beans, green peas, asparagus, and sugar beets. For these reasons, the estimates of production under mature conditions can be accepted with more assurance than could estimates of annual production during the period of development.

D. Future Economic Activity in the Columbia Basin

Substantial increases in transportation needs may be anticipated from the projected expansion of irrigation agriculture in the Columbia Basin project. The magnitude of the increase may be appreciated by the expected growth of the population: from 38,500 in 1952 to

Table 23

PATTERN OF LAND USE EXPECTED UNDER MATURE DEVELOPMENT OF THE COLUMBIA BASIN PROJECT, 1945 AND 1952 ESTIMATES

Crops	1945 Estimate 1/ (Entire Project)		1952 Estimate 2/ (597,390 Acres)	
	Acres	Percent	Acres	Percent
Hay and Pasture				
Alfalfa 3/	369,511	34.0	159,191	28.1
Clover 3/	35,687	3.3	28,361	5.0
Other Hay	22,257	2.0		
Pasture	252,476	23.2	113,711	20.1
Subtotal	679,931	62.5	301,263	53.2
Grains				
Small Grains	152,261	14.1	84,369	14.9
Corn	68,016	6.3	22,774	4.0
Subtotal	220,277	20.4	107,143	18.9
Field Crops				
Sugar Beets	50,369	4.6	44,275	7.8
Potatoes	18,022	1.7	22,219	3.9
Dry Beans			16,215	2.9
Onions	57,730	5.3	2,815	0.5
Miscellaneous				
Subtotal	126,121	11.6	192,667	15.1
Truck Crops	31,334	2.9	36,750	6.5
Tree and Vine Crops				
Grapes			9,807	1.7
Apples and Pears	28,061	2.7	8,517	1.5
Soft Fruits 4/			17,470	3.1
Subtotal	28,061	2.7	35,794	6.3
Total Cropland	1,085,724	100.0	566,474	100.0
Farmsteads, etc.	134,682	--	30,916	--
Total Irrigable Acreage	1,220,406	--	597,390	--

1/ Columbia Basin Joint Investigations, Types of Farming, Problem 2, Bureau of Reclamation, U. S. Department of the Interior, p. 30, Table 10.

2/ Prepared by Economics Branch, Bureau of Reclamation, Ephrata, Washington, October 1952.

3/ Includes duplication for legume seeds.

4/ Includes peaches, apricots, and other soft fruits.

123,000 upon mature development of the 600,000-acre program in 1963. A somewhat slower rate of development is assumed for the balance of the irrigable acreage: mature development by 1975, at which time the population of the Basin may approximate 260,000.1/

The following discussion emphasizes the needs for transportation services created by the farm population; yet it is necessary to keep in mind constantly the total transportation needs of the community. Experience in other projects indicates that irrigation development generates economic enterprises and activity necessary for serving agriculture. An examination of the future transportation load of an expanding irrigation project involves a consideration of the prospective growth, not only of agriculture but of the secondary and tertiary industries stimulated by the basic investment in agriculture. These industries include all handlers and processors of agricultural products, wholesalers and retailers supplying commodities for farm living and farm production, and the business groups supplying services indirectly to agriculture. In addition, the development of agriculture and associated service industries may stimulate investments in other industries not directly connected with the extension of irrigation.

These considerations, therefore, raise a question concerning the full transportation load that may be expected as a result of the development of the Columbia Basin project. In this respect research results are extremely meager in determining the relationship between agricultural and concomitant industrial development. Case studies of Weld County, Colorado, and Payette County, Idaho, present relationships with a high degree of correspondence. They show that for every dollar of agricultural income there was generated an additional $1.30 of income in the services auxiliary to the agricultural economy.2/ Although the income relationships are useful, they do not provide an accurate indication of the transportation load that may be generated by the two segments of the economy, but they do indicate their relative economic importance. For obvious reasons, the volume of traffic cannot be predicted without much detailed knowledge of the characteristics of agricultural and nonagricultural development of the area.

1. Projected Population Growth of The Columbia Basin

The Bureau of Reclamation is responsible for careful projections of the future population of the Basin. These estimates

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1/ Bureau of Reclamation, Report on Tentative Population Forecasts for the Columbia Basin Project Area, 1960 and 1980. The results of this study have been modified for the present purpose by assuming mature development of the million-acre program in 1975.

2/ Marts, M. E., An Experiment in the Measurement of Indirect Benefits of Irrigation, Payette, Idaho.
Bentson, M. S. and R. E. Struthers, Accomplishments of Irrigation, Weld County, Colorado, South Platte River District.

are founded upon the relationship of farm workers and nonfarm workers based upon the experience in three mature northwestern irrigation projects.1/ According to these projections, the addition of 6,300 new farm units in the 600,000-acre program to be completed by 1963 will result in a total population of 123,000. For the present analysis, it is assumed that an additional three years are required before a full development of the 600,000-acre program is achieved. The Bureau of Reclamation also projected a population of 260,000 for the completion of the million-acre program. The breakdown of population between farm and nonfarm residents, and among the three counties in the Basin, is shown on Table 24.

Table 24

BREAKDOWN OF PROJECTED POPULATION
(Columbia Basin, 1963 and 1975)

Counties1/	600,000-Acre Program, 1963			Million-Acre Program, 1975		
	Total	Farm	Nonfarm	Total	Farm	Nonfarm
Grant	97,000	26,700	70,300	124,000	32,700	91,300
Adams	15,600	4,300	11,300	56,000	14,700	41,300
Franklin	34,400	9,500	24,900	80,000	21,100	58,900
Total Basin	147,000	40,500	106,500	260,000	68,500	191,500

1/ County breakdown assumed proportional to projected irrigated acreage.

Source: Bureau of Reclamation, Report on Tentative Population Forecasts for the Columbia Basin Project Area, 1960 and 1980.

2. Transportation Load Attributable to Agriculture

Volume of Farm Purchasing. In the earlier stages of development there is a considerable inflow of capital for the necessary investments in agriculture. During this period, inshipments of commodities required for farm family living and production is in excess of outshipments. The Bureau of Reclamation has made estimates of the probable inshipments of freight to meet the needs of the farm population. Estimates are based upon a study of the procurement pattern of farmers in the Owyhee and Boise irrigation areas. According to this experience, about

1/ These projects include southwestern Idaho area, the south central Idaho area, and the south central Washington area. Bureau of Reclamation, Report on Tentative Population Forecasts for the Columbia Basin Project Area, 1960 and 1980, Ephrata, June 1953. Op. cit.

19,000 carloads per annum may be expected to be shipped in to farmers in the Columbia Basin in connection with the 600,000-acre program. Proportionately, the million-acre program may generate annual inshipments of 29,400 carloads of commodities required by agriculture.

Stages in Agricultural Production. From the standpoint of planning adequate facilities for marketing agricultural commodities in the Columbia Basin, it is extremely important to know the rate as well as the extent of future irrigation development. The potential entrepreneur interested in making investments in marketing facilities wants to know not only the ultimate volume expected to be moved but the rate of expansion in the production of the commodities in question.

There is a lag between the availability of water for irrigation and full agricultural production. First there is some delay in getting farmers on the land. Usually there is an even longer delay in developing the production program on the farm. The farm program may be conceived in two phases. In the early stage, the farmer is urgently in need of cash and for that reason will produce crops that will give an immediate cash return. Meanwhile, he will build up his pasture and increase livestock numbers. Eventually it is expected that the livestock and pasture program will dominate the agriculture of an area. For these reasons, the shape of the production pattern expected in the Columbia Basin differs for various commodities (Table 25). Production of cash crops begins at a relatively high level and soon approaches maximum development. On the other hand, the production of livestock and dairy products is slower in the early stages, but increases more rapidly in the later stages of the program. According to the 1952 projection, it will be recalled, approximately 53.2 percent of the land irrigated is expected to be in pasture and hay crops when mature development of the project has been achieved (Table 23).

Growth in the Volume of Farm Sales. Approximately 4.3 thousand carloads of crops were produced in the Columbia Basin project in 1952 (Table 26). Of these, potatoes accounted for approximately 2,000 carloads, wheat from dry land for 800 carloads, and sugar beets for 700 carloads. Alfalfa and other kinds of hay were also of considerable importance, yielding close to 400 carloads.

Upon completion of the project, hay products are going to account for the largest volume of any single crop. From the standpoint of outshipments, sugar beets, and then potatoes are expected to be next in importance. Fruits and truck crops are also likely to become of considerable future significance in shipping volume.

Table 25

GROWTH AND ESTIMATED FUTURE PRODUCTION OF SELECTED AGRICULTURAL COMMODITIES, COLUMBIA BASIN PROJECT AREA[1]
1952-1963

Year	Irrigated Acres	Livestock: Cattle and Calves (1,000 lbs. live wt.)	Livestock: Sheep and Lambs (1,000 lbs. live wt.)	Livestock: Hogs and Pigs (1,000 lbs. live wt.)	Livestock: Total (1,000 lbs.)	Whole Milk (1,000 lbs. milk equiv.)	Sweet Corn (1,000 lbs.)	Potatoes (1,000 lbs.)
1952	87,819	40	—	290	330	3,300	1,600	23,100
1953	154,854	400	—	800	1,200	16,700	4,200	135,900
1954	218,154	2,100	200	1,500	3,800	37,000	7,800	215,900
1955	292,879	4,900	400	2,200	7,500	70,400	13,000	304,800
1956	374,099	8,800	1,200	3,600	13,600	114,800	18,800	373,600
1957	439,373	12,700	1,400	4,100	18,200	147,900	23,400	401,800
1958	498,737	17,000	2,100	4,700	23,800	178,000	27,400	466,500
1959	556,347	20,700	2,700	5,300	28,700	207,000	30,800	508,800
1960	596,572	24,000	3,100	5,900	33,000	230,000	33,800	543,600
1961	596,572	26,900	3,500	6,600	37,000	250,000	36,000	560,700
1962	596,572	29,300	3,900	7,300	40,500	267,000	38,000	577,700
1963	596,572	30,700	4,000	8,200	42,900	284,000	40,000	588,300

1/ Includes cull cows and veal calves from the dairy enterprise.

Source: Adapted from estimates of the Bureau of Reclamation, Ephrata, Washington, based on Grant County 1952-57 and mature development.

Table 26

VOLUME OF CROP MARKETINGS FROM THE COLUMBIA BASIN PROJECT
1952-1963

Crops	1952 Tons	1952 Carloads	1963 Tons	1963 Carloads
Hay and Pasture				
Alfalfa	5,207	364	556,955	37,130
Other Hay	545	38	19,106	1,274
Pasture (AUY)	(562)	--	(71,265)	--
Grains				
Small Grain 1/	1,511	36	94,569	2,101
Field Corn	643	20	38,850	1,295
Wheat (Dry Land)	33,874	797	2/	2/
Field Crops 3/				
Legume Seed	614	20	1,730	58
Dry Beans	2,042	58	13,930	398
Potatoes	46,313	1,971	275,917	11,037
Sugar Beets	25,920	682	906,562	23,857
Onions	3,363	210	38,991	2,437
Truck Crops	2,431	113	199,305	6,644
Tree and Vine Crops				
Grapes	1	0	40,749	1,358
Apples 4/	143	12	89,096	7,425
Peaches 5/	2	0	92,360	7,697
Total Volume	122,609	4,321	2,368,120	102,711

1/ Includes oats, barley, and sorghum.
2/ Included in "Small Grains" in 1963.
3/ Includes watermelons, cantaloupe, berries, sweet corn, peas (for freezing), carrots, and rutabagas.
4/ Including pears.
5/ Including apricots and other soft fruit.

Source: Bureau of Reclamation, Ephrata, Washington.

As far as the hay crop is concerned, it is anticipated that the future livestock population of the Basin will preclude outshipment of all the hay supply expected, namely, 37,000 carloads (Table 26). In fact, production of this volume may be economically feasible only if it supplies a local livestock population. Thus, the transportation load in the Basin may be augmented by only a fraction of this hay supply, but by a substantial livestock volume.

Sugar beet production may require movement of the equivalent of 24,000 carloads to local refineries by 1963.

In terms of carload volume, the potato crop is going to be second in importance. It is estimated that it will expand to 11,000 carloads by 1963 compared to a 1952 movement of 2,000 carloads. The rate of build-up is expected to be quite rapid so that about half the entire volume will be produced by 1955 and about three quarters of the potential will be achieved by 1958.

Sweet corn is expected to be one of the most important truck crops produced in the Basin. It is particularly important now as a frozen food product in the Yakima irrigation area and in the Columbia Basin. Cut sweet corn is already being frozen in considerable quantity. Of the potential volume of 20,000 tons or nearly 700 carloads by 1963, it is expected that the halfway mark will be achieved by 1957 and three quarters of total by 1961. The build-up in sweet corn production is therefore anticipated to be somewhat slower than that in the marketing of potatoes.

Livestock marketing is estimated at about 71,000 animal units, or nearly 1,800 carloads of all species by mature development in 1963. Relatively slow development of the livestock industry is indicated by the fact that not quite half of production is expected by 1957. A considerable increase in production may follow the availability of water in 1960, thus indicating that time is extremely important in reaching mature development for this enterprise. Eventually, hogs and pigs are expected to account for about one-fourth of livestock volume. Sheep and lambs will account for about five percent, and cattle and calves will constitute the bulk of the enterprise. Production of hogs is expected to be a fairly important enterprise in the early stages of development, but cattle and calves are believed to be more profitable in the latter stages.

Using the same method of procedure it is estimated that about 284 million pounds of milk will be marketed in the Basin by 1963 with half the potential volume expected by 1957. Assuming the same pattern of farming throughout the Basin, the bulk of the dairy industry is going to be located in Grant County, where about two-thirds of the volume may be expected

by 1963. Production in Franklin and Adams counties will become more important in the second phase of the development of the Basin as more water is made available to that area.

3. Requirements for Marketing and Processing Facilities

Facilities for marketing agricultural commodities are still meagerly developed in the Columbia Basin, as might be expected in an area where the volume of production is still relatively small. In most instances, production is insufficient to meet requirements and firms are geared to handle inshipment of supplies for local distribution.

The milk trade is particularly concerned with the development of a local source of supply. Much effort is bent toward developing a high-level consuming market, and much thought is going into the organization of marketing facilities, including transportation, while a local milk supply is being stimulated. A great deal of concern is to be expected regarding the rate of development in the Basin and the most remunerative future utilization of milk products.

The frozen food industry is currently engaged in distribution of supplies brought in from the outside. In addition, an aggressive development of sources of supply is under way. Processors are contracting with farmers for production when water is available for irrigation purposes. As in the case of milk, no local processing facilities are yet available, and supplies must be moved outside the area for processing until volume becomes sufficient to warrant construction of processing facilities. Another year, and perhaps two, may elapse before such a step is warranted on economic grounds.

The sugar beet marketing situation is similar. Currently, while production is low, the beets are shipped to Wenatchee and Toppenish for processing. One plant has been completed and another is being planned. Eventually, heavy beet production in other areas, particularly near Pasco, will make the construction of new plants desirable.

The livestock industry is still geared to outshipment and custom slaughtering of limited local supplies, though most of the requirements of dressed meats are shipped in. The limited facilities for yarding, slaughtering, freezing, and storage are the embryo from which an industry handling substantial slaughtering and holding of local supplies could develop.

Seeds and feeds are shipped in at the present time. There should be little difficulty for the handlers of seed and feed to adjust to an expanding local supply and an eventual surplus situation by the installation of cleaning and mixing facilities as warranted.

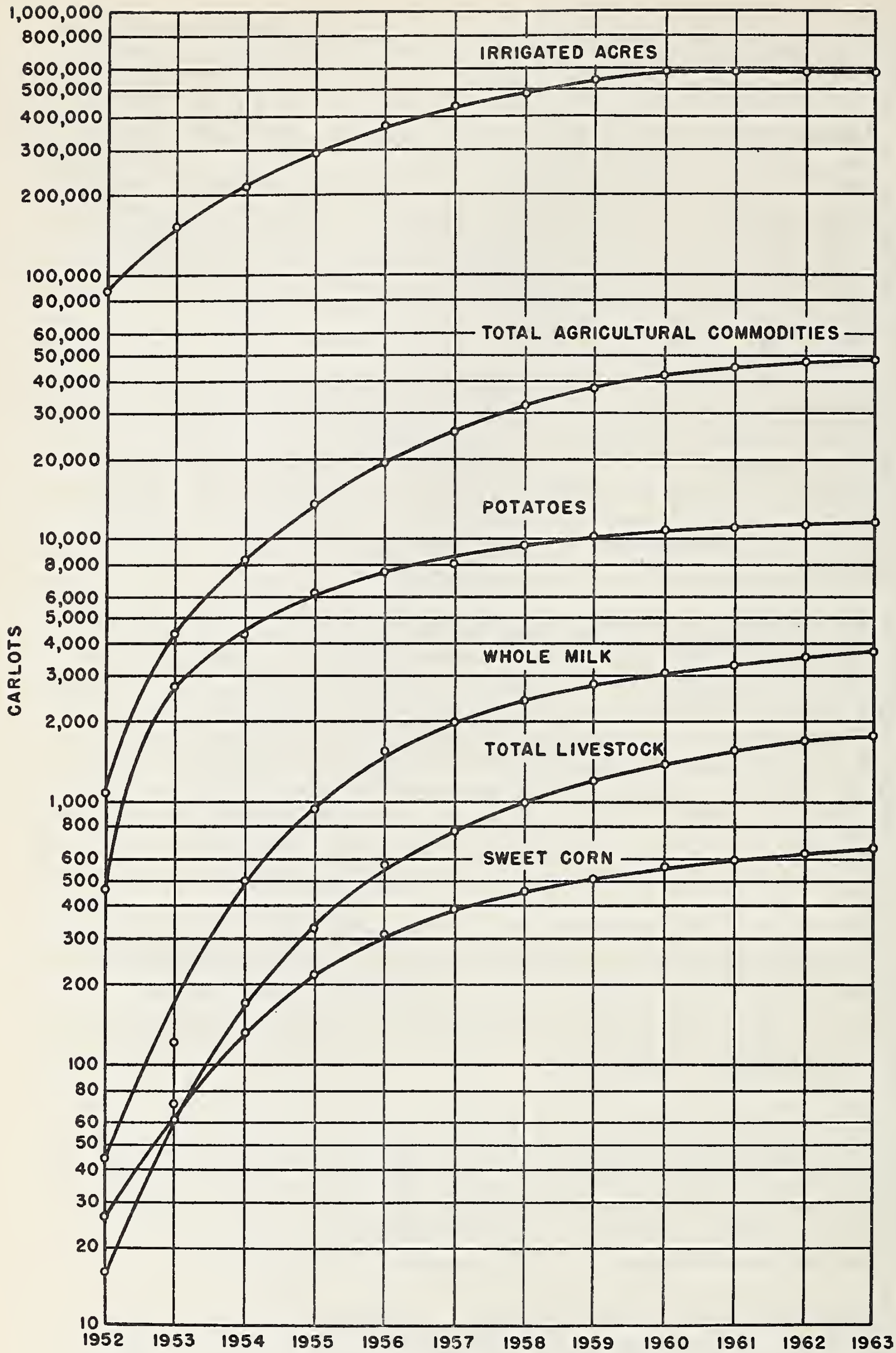

Figure 7

PROJECTED MARKETINGS OF AGRICULTURAL COMMODITIES IN CARLOTS, COLUMBIA BASIN PROJECT AREA, 1952-1963

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Section VII

TRANSPORTATION FACTORS AFFECTING MAJOR COLUMBIA BASIN COMMODITIES

The following sections of the report are devoted to a discussion of the competitive transportation and marketing problems facing the Columbia Basin and the Pacific Northwest. The analysis is concerned with five commodity groups: dairy products, livestock and meats, potatoes, wheat, and frozen fruits and vegetables.

Dairy Products

A. Fluid Milk and Milk Products

1. Milksheds of the Pacific Northwest

The major milksheds of the Northwest that may be expected to impinge upon the milk supply of the Columbia Basin are the Seattle milkshed of the Puget Sound marketing area, the Spokane milkshed, and the milksheds of Yakima and Walla Walla in south central Washington. These milksheds account for the bulk of 1,446 million pounds of milk marketed by farmers in 1952 in the State of Washington.[1/] The Puget Sound milk marketing area alone received 604 million pounds of whole milk from producers.[2/]

The Puget Sound Milkshed. With one exception, the Puget Sound marketing area and milkshed coincide (Figure 8). This exception is the so-called Peninsula area west of Puget Sound. The marketing area extends south from the Canadian border, west of Range 8 in the counties of Whatcom, Skagit, Snohomish, King, and Pierce. South of Bremerton and Tacoma, it includes the counties of Thurston, Lewis, and the southern portion of Grays Harbor. In the Puget Sound milkshed, the seasonal peak and seasonal trough are in May and November, respectively, with the daily receipts in the peak period exceeding by 50 to 60 percent the receipts in the period of shortage. In 1952 sales of Class I milk, consisting of fluid milk and fluid cream, accounted for 442 million pounds, or about 75 percent of total receipts.

Sales of fluid milk, excluding skimmed and flavored milks, accounted for about 90 percent of Class I usage. About 35 million pounds of milk were disposed of outside the marketing area, and the remainder of the milk supply was utilized in various manufactured products.

1/ Bureau of Agricultural Economics. Farm Production, Disposition and Income from Milk, 1951-52, p. 12.

2/ Market Administrator's Office. Statistical Information for the Puget Sound-Washington Marketing Area, p. 6.

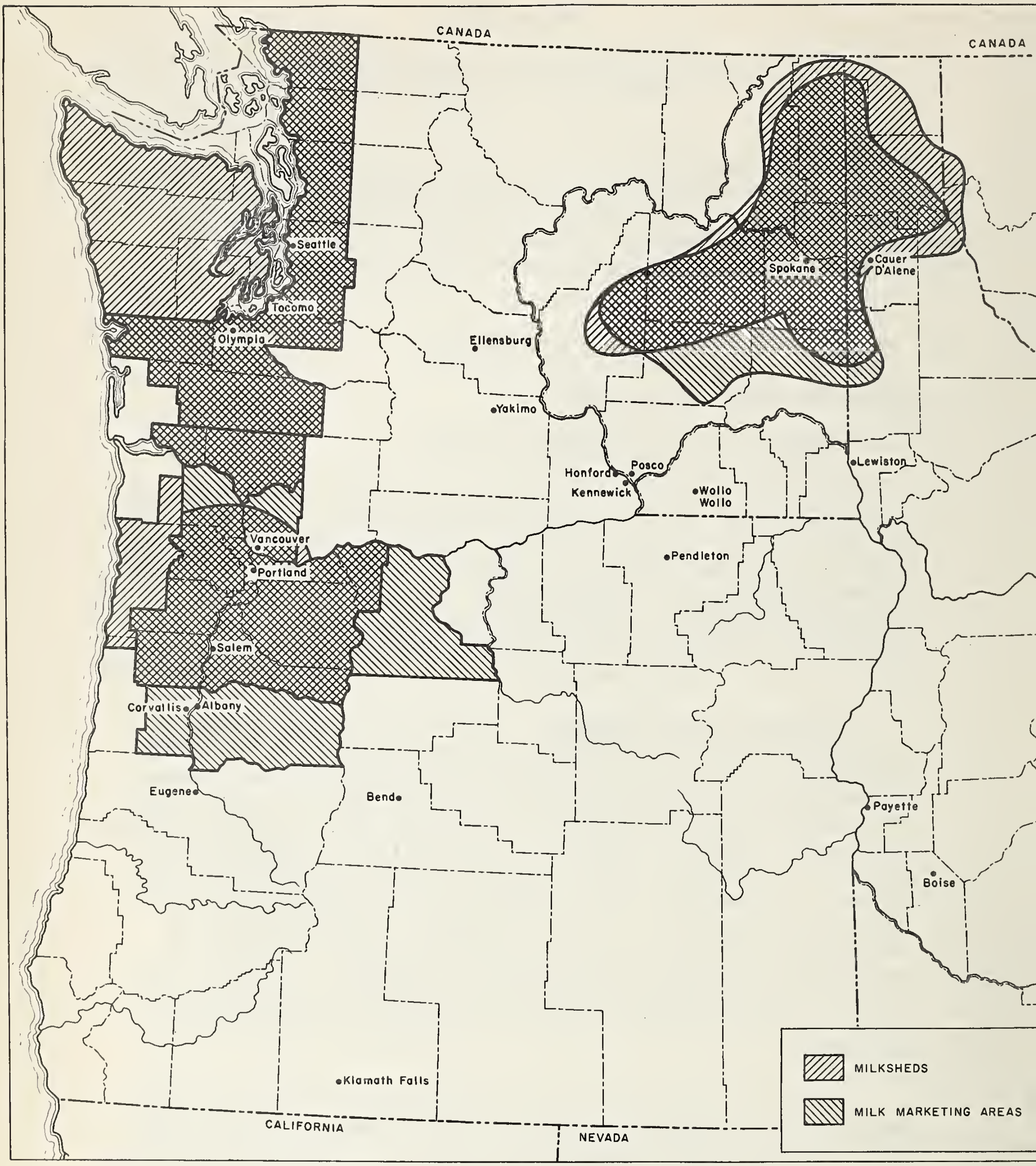

Figure 8

MAJOR MILKSHEDS AND MILK MARKETING AREAS IN THE NORTHWESTERN STATES
1953

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The Spokane Milkshed. The Spokane Milkshed includes the neighboring counties in northeastern Washington north to the Canadian border, as well as the northern Idaho counties and a small portion of western Montana. Both the market and milkshed presently extend into the Columbia Basin area as far as the town of Quincy in western Grant County. In the short season when supplies become tight, fluid milk is brought in from the Puget Sound marketing area and from the Missoula, Montana, area. As much as 90 percent of Grade A receipts are utilized as Class I, and very little milk is manufactured.[1]

The Portland Milkshed. Currently, the Portland supply area has been extended to include Wahkiakum County, the southern part of Pacific County, and the counties of Cowlitz and Clarke.[2] In Oregon, the Portland milkshed extends from Wasco County on the east, south to Marion County, and west to the coast, including the northern part of Lincoln County. The marketing area is somewhat smaller in size, and excludes the more distant parts of the milkshed near the coast and in the extreme east. The market administration has control only over the Oregon portion of the market. Vancouver, Washington, is an uncontrolled market, and obtains milk supplies from the adjacent counties in southwestern Washington.

2. Shifts in Location of Milksheds in the Pacific Northwest

The ultimate objective of this analysis is to determine the probable utilization of milk in the course of developing the Columbia Basin Project. The analysis assumes an efficient usage of milk supplies, which should tend to increase returns to farmers and to milk handlers in the central Washington area. The projections of milk production in the Basin are those of the Bureau of Reclamation and the State College of Washington.

A theoretical procedure was used for determining the future location of milksheds for the major cities of the Northwest. For this purpose, costs of assembling, receiving, processing, and transporting milk to the city market have been collected and developed for analysis. The accuracy of the estimates may be expected to hinge upon the prospective milk supply situation as well as the growth of the consuming population. The method involves an attempt to reproduce the behavior of the economic forces that operate in dairy marketing.[3] Available milk supplies are allocated among the major competing markets to

1/ Information obtained from R. S. Canfield, Inland Empire Dairy Association, and E. L. Baum, State College of Washington.

2/ Extension of production area recorded in Official Order GO 223, effective May 1, 1953, Milk Marketing Administration, State of Oregon.

3/ The method is described in detail by William Bredo and A. Rojko, Prices and Milksheds of Northeastern Markets.

achieve an "efficient" allocation of milk supplies among markets and utilization of milk in various alternative uses. A necessary condition is that the total costs of performing the specific marketing services necessary will be the minimum consistent with the consumption needs of the markets.

3. Northwest Milk Supply-Consumption Balance, 1949 and 1963

In allocating milk supplies efficiently among the major Pacific Northwest milk markets, the analysis is focused on the consumption and the supply of milk available for the nonfarm population. Farmers' sales of milk and cream represent the total volume of milk available for nonfarm consumption. Assuming that the farm population has met its needs for milk, this analysis allocates the supply of milk necessary to meet the consumption requirements of the nonfarm population for fluid milk, fluid cream, and ice cream. Consumption of these products by the nonfarm population is obtained for 1949 as a residual after deducting the milk equivalent of manufactured products. The Seattle, Portland, and Spokane markets are considered the first claimants for this supply, and the balance is allocated among remaining counties of the states in proportion to population.1/

In projecting the supply-consumption balance of the Pacific Northwest to 1963, it is assumed that no change occurs in the per capita consumption of fluid milk, cream, and ice cream. Farmers' sales of milk available for the nonfarm population are projected to 1963 by a linear logarithmic trend.2/

According to this analysis, a very substantial reduction occurs in the volume of milk available for manufactured products between 1949 and 1963 (Table 27). Between these years this volume declines in the short season, from 13,300 to 10,450

1/ Per capita consumption of fluid milk, assumed to be 0.9 pounds per day, milk equivalent, for Seattle, Portland, and Spokane, was based on An Economic Study of Dairy Products Consumption in Seattle, Washington by E. L. Baum and I. L. Corbridge. Statistics on sales of fluid milk and fluid cream in the Seattle and Portland markets indicates cream sales were 22 percent of milk sales, a relationship used in determining per capita cream consumption. Per capita ice cream consumption was assumed to vary by states, being considered equal to production. Combined daily per capita consumption of fluid milk, cream, and ice cream in these Washington and Oregon metropolitan markets were 1.24 pounds and 1.28 pounds per person per day, respectively.

2/ Production is projected by extrapolating the trends in the period 1935-39 and 1947-52.

Table 27

SUPPLY-CONSUMPTION BALANCE OF MILK PRODUCTS, NORTHWEST STATES
SHORT SEASON 1949 AND PROJECTED 1963
(Cwt. per Day)

State	Farmers' Sales of Milk and Cream (Milk Equivalent, Fat Basis) 1/	Milk Products Manufactured (Milk Equivalent, Fat Basis)	Nonfarm Consumption of Fluid Milk, Cream, and Ice Cream (Milk Equivalent Fat Basis)
		1949	
Washington	36,977	13,284 2/	23,693
Oregon	22,547	7,802 2/	14,745
		1963	
Washington	42,400 3/	10,450	31,950 4/
Oregon	20,240 3/	430	19,810 4/

1/ U. S. Department of Commerce, Bureau of the Census. Based on yearly data from Census of Agriculture, 1950.

2/ U. S. Department of Agriculture, Bureau of Agricultural Economics. Production of Manufactured Milk Products, 1949.

3/ Estimated by logarithmic projection. Washington adjusted for increased productivity in Columbia Basin.

4/ Based on population estimates for the states, assuming farm population remains unchanged, and the increase is in nonfarm population.

hundredweight per day in the state of Washington. Oregon is tending rapidly to approach a situation when only small amounts of milk may be expected to be manufactured, as evidenced by the decline in manufacturing from 7,800 in 1949 to 430 hundredweight per day in 1963.

Supply, consumption, and the extent of surplus or deficit were determined for each county. The analysis was based on 1949 because of the availability of census information on a county basis for milk production and population. Estimates of 1949 milk production by the Bureau of Agricultural Economics were prorated among the counties according to the census relationship of county to state production.

4. Future Milk Surplus in the Columbia Basin

Milk supplies anticipated were allocated among the three Basin counties according to the acreage to be irrigated under the Bureau of Reclamation 600,000-acre program. According to these estimates, in the short season 7,350 hundredweight of milk equivalent per day would be produced by 1963, of which Grant County will produce 4,600 hundredweight (Table 28). Nonfarm consumption in 1963 of 900 hundredweight in the form of fluid milk, cream and ice cream leaves a surplus of 6,450 hundredweight of whole milk equivalent available for disposition after the needs of the population in the Basin have been met. This surplus may rise to 9,300 hundredweight by 1975.

5. The 1949 Milksheds

The salient features of the major milksheds of the Pacific Northwest can now be described (Figure 9 and Table 29). The analyses refer to the short season of the year when the milk supply is drawn from a maximum area. Based on 1949 conditions, the Seattle and Portland milksheds are in contact near the southern boundary of Lewis County in Washington. The Seattle (Puget Sound) milkshed could have obtained all its supplies including a 10 percent reserve for efficiency within a radius of 90 miles of the Seattle-Tacoma-Bremerton metropolitan complex.1/

Supplies for the Portland-Vancouver metropolitan area could have been obtained from the 70-mile radius which extends into Tillamook County on the west, Hood River County on the east, and reaches into the southern three or four counties of Washington. The milksheds of the smaller Oregon communities

1/ The deviation of these results from the areas from which supplies were actually obtained in 1953 may be due in part to the structure of the transportation charges prevailing under the Puget Sound Market Administration.

Table 28

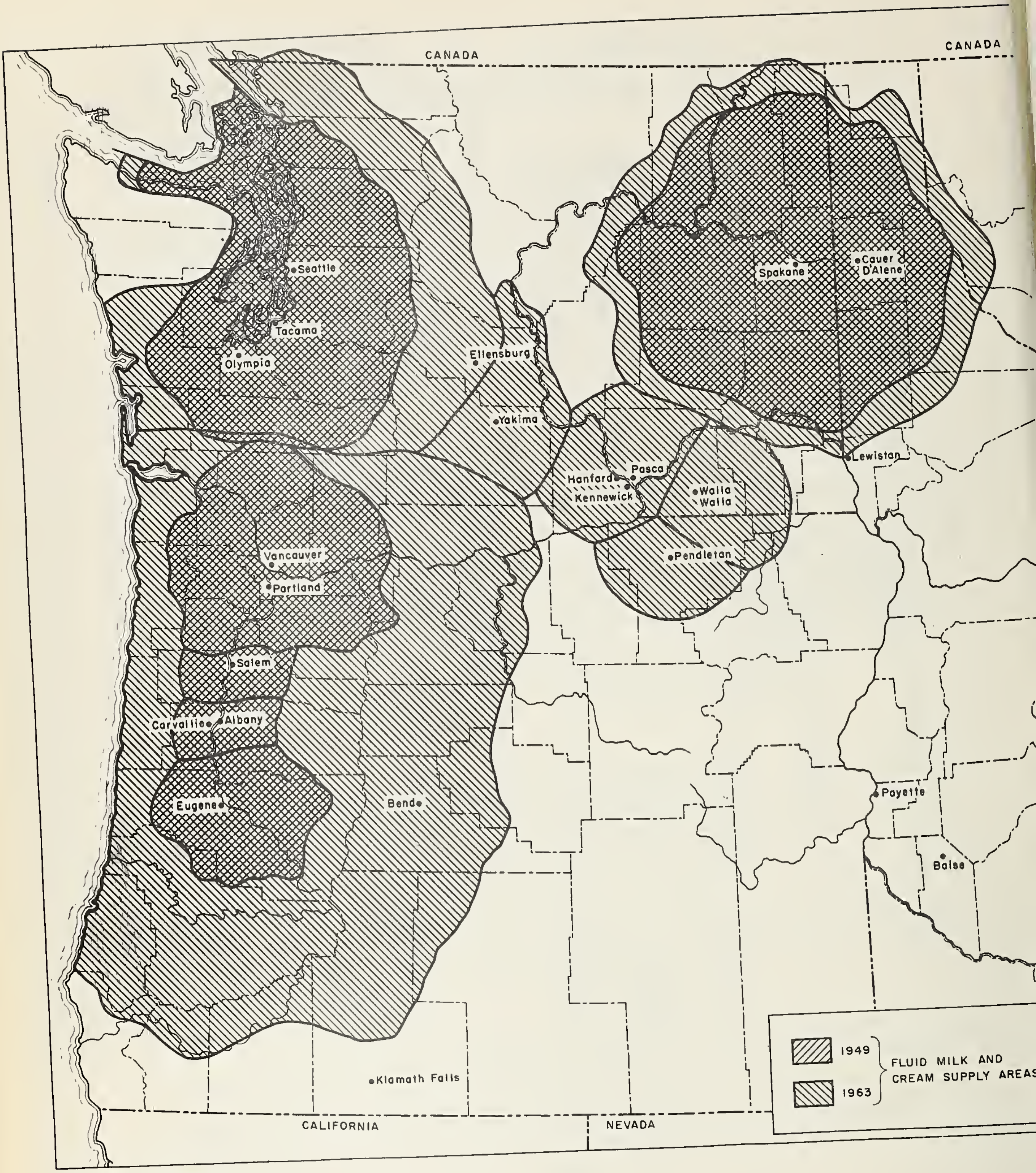
PROJECTED MILK PRODUCTION, CONSUMPTION, AND SURPLUS IN THE COLUMBIA BASIN BY COUNTIES, 1963 AND 1975
(Milk Equivalent)

	1963 (600,000-Acre Program)					Surplus	
		Milk Marketed					
County[1]	Irrigated Acreage[2]	Total Million Pounds	Short Season Cwt/Day	Peak Season Cwt/Day	Nonfarm Consumption[3] Cwt/Day	Short Season Cwt/Day	Peak Season Cwt/Day
Grant	373,936	178	4,600	7,650	600	4,000	7,100
Adams	63,881	30	800	1,300	100	700	1,200
Franklin	158,755	76	1,950	3,250	200	1,750	3,050
TOTAL BASIN	596,572	284	7,350	12,200	900	6,450	11,300

	1975 (1,000,000-Acre Program)					Surplus	
		Milk Marketed					
County[1]	Irrigated Acreage[2]	Total Million Pounds	Short Season Cwt/Day	Peak Season Cwt/Day	Nonfarm Consumption[3] Cwt/Day	Short Season Cwt/Day	Peak Season Cwt/Day
Grant	466,000	206	5,350	8,800	750	4,600	8,050
Adams	210,000	93	2,400	4,000	500	1,900	3,500
Franklin	302,000	133	3,450	5,700	650	2,800	5,050
TOTAL BASIN	978,000	432	11,200	18,500	1,900	9,300	16,600

1/ County breakdown of milk production assumed proportional to projected irrigated acreage.
2/ County acreage breakdown estimated.
3/ Based on population estimates for the states, assuming farm population remains unchanged, and the increase is in nonfarm population.

Source: Estimated by Stanford Research Institute on the basis of irrigation program and production data of the Bureau of Reclamation.



1/ INCLUDES ICE CREAM

Figure 9

THEORETICAL MILKSHEDS IN THE NORTHWESTERN STATES
1949 AND PROJECTED 1963

Table 29

THEORETICAL COMPARISON OF MAJOR NORTHWEST MILKSHEDS, 1949 AND 1963 AND RELATIVE PRICES, 1963

Milksheds	Milksheds Maximum Radius (Miles) 1949	1963	Prices Relative To Seattle (Cents per Gwt) 1963
Spokane	100	120	- 1
Seattle	90	130	Base Price
Portland	70	140	+ 1
Salem	40	50	-11
Corvallis	30	40	-14
Eugene	50	160	+ 3
Yakima	n.a.	40	-13
Pendleton	n.a.	40	- 9
Walla Walla	n.a.	50	- 9
Pasco-Kennewick-Richland	n.a.	50	- 9

Source: Stanford Research Institute.

of Salem, Albany, Corvallis, and Eugene lie in the counties that make up the Willamette Valley. These communities probably did not get any extensive supplies from the coastal dairying areas in central Oregon.

The Spokane milkshed extended approximately 100 miles to the Montana border on the east, the northern end of Platt County on the west, and the southern part of Whitman County in the Pullman-Moscow area.1/

This theoretical analysis for 1949 is a close approximation to the actual location of milksheds during the 1953 period, except that the 1949 milksheds were somewhat smaller. It is important to note that the present day milkshed of the Seattle market is entirely west of the Cascade Mountains. In mid-1953 some milk supplies moved from Ellensberg in Kittitas County across the Cascades into the Seattle market, indicating that the situation in this market may soon be such as to favor the inshipment of milk from the interior of the state. Similarly, in respect to the Spokane market, some emergency shipments of milk were obtained from the Missoula area in Montana in extremely short supply seasons.

1/ This analysis does not attempt to delineate the milksheds of the smaller communities which may lie within those of the larger metropolitan areas.

6. The 1963 Milksheds

Very profound changes in the future boundaries of milksheds in the Northwest may be anticipated primarily as a result of the large expansion of population in the major cities. The magnitude of these shifts may be observed by noting that non-farm consumption of fluid milk, cream, and ice cream may increase about 8,000 hundredweight in Washington and 5,000 hundredweight in Oregon and that the milk available for manufacture will decline by about 2,800 and 7,400 hundredweight, respectively (Table 27).

The most significant change in the milksheds of the Pacific Northwest is the anticipated expansion of the Portland milkshed from 70 miles to 140 miles (Figure 9). This will force the Eugene market to extend its milkshed south into the southern end of Coos County, and into Josephine and Jackson counties. The other important feature is the extension of the milksheds in the Willamette Valley to the seaboard of the coastal counties, although very little additional milk appears to be in prospect there. The Portland milkshed will undoubtedly extend across the mountains to the east, particularly into the Deschutes irrigated area. The Portland milkshed will also extend further into the southern counties of Washington, but the present boundary with the Seattle milkshed is not likely to change very much.

The milkshed of the Puget Sound markets may be expected to expand from 90 to 130 miles. Besides further tapping, the surpluses now available in Whatcom and Skagit counties in the north, the Seattle milkshed will extend into the irrigated areas across the mountains in Kittitas and Yakima counties. Competition from the West and from the South will force the cities of this area, Yakima, Ellensberg, and Wenatchee, to extend their fluid milk supply areas farther to the east, into Grant County in the Basin just across the Columbia River.

The Spokane market is likely to undergo the least expansion in its milkshed in meeting the demands of the future. Substantial supplies of milk are available in the counties to the northwest and to the northeast.

Relatively large surpluses of milk will develop in Adams County and in northeastern Grant County around Moses Lake in the Columbia Basin. In addition, the Spokane milkshed will probably continue to obtain supplies from the surplus Missoula, Montana, dairying area.

South of the Spokane milkshed, a deficit milk supply area of considerable size appears in prospect created by Pendleton and Walla Walla and the Pasco-Kennewick-Richland market group. The increased consumption of the Pasco group will probably

take the entire supply forthcoming in Franklin County and a portion of the supplies that may become available with irrigation in western Adams County.

This analysis indicates that Grant County in the Columbia Basin is eventually going to become an important surplus milk producing area, and an important source of manufactured milk products in the state of Washington. It is difficult to be precise in measuring the volume of milk available for manufacturing. By 1963 the surplus in Grant County may be as much as 4,000 hundredweight per day in the short supply season and 7,100 hundredweight daily in the flush milk production season (Table 28).

7. Intrastate Movement in Washington

In the short season, the large Puget Sound and Portland metropolitan areas maintain relatively large receipts in relation to requirements of fluid milk and cream and sell considerable supplies to smaller nearby markets. Normally, in the short season the Puget Sound marketing area ships milk across the state to Spokane, Pullman-Moscow, Lewiston, and other markets in the eastern part of the state. During the flush season of 1953, an unusual milk movement occurred: During recent years, the Ellensburg area has rapidly been developing into a surplus area supplying milk to Yakima on the south and Wenatchee to the north. In the 1953 season, the local surplus became too large, and some of the milk moved over the Cascade Range to the Seattle market. This development may be indicative of the future growth of the surplus milk supply area in central Washington.

8. Intermarket Milk Price Relationships

Pacific Northwest. In discussing future milk price relationships, it is assumed that a complete adjustment will have been made by 1963 to the method of handling milk in bulk in the important dairying areas of the Northwest. Under these marketing methods the structure of milk price relationships should be established relatively simply in theory as well as in practice based upon the following type of marketing structure.

(1) Areas near the market: Pick up of milk in tank trucks from farm tanks, and direct haul to the city receiving plant for cooling, storing, pasteurizing, and bottling or manufacturing.

(2) Areas distant from the market: Pick up of milk in tank trucks from farm tanks, and haul to the country manufacturing plant for receiving, cooling, and storage.

a. Transfer from collecting tank truck to over-the-road tank truck for haul to city receiving plant, or

b. Storage in country receiving plant holding tank, and later shipment as whole milk to the city plant for bottling, or

c. Separation, and shipment of fluid cream to the city plant, and

d. Manufacturing of milk into various milk products.

Under the milk marketing set up based upon the country receiving station, price relationships between Seattle and Portland metropolitan markets are a direct function of the maximum radius of the milk supply area, since these milksheds are in direct contact. In the analysis for 1963, it is possible to determine an efficient relationship also between Spokane and these two coastal markets in view of the prospective extension of the Seattle milkshed into a common surplus area in central Washington. The "efficient" price relationships based upon farm tank holding and tank truck shipment to the city plant are indicated in Table 29. The Spokane price for whole milk at the plant receiving platform would be 1 cent per hundredweight below Seattle, and Portland would be 1 cent higher.

Columbia River Basin. The price difference between the plant in the Spokane market and the producing area in the Columbia Basin can be broken down as follows:

Table 30

HYPOTHETICAL ASSEMBLY, RECEIVING, AND TRANSPORTATION CHARGES FOR WHOLE MILK MOVED FROM THE COLUMBIA BASIN TO SPOKANE, 1953 PRICES

Farm Tank and Tank Truck System	Cost per Hundredweight
Transportation, 120 Miles 1/	$0.23
Receiving 2/	0.09
Assembly 1/	0.17
	$0.49

1/ Appendix Tables A-16 and A-17.
2/ Baum, E. L. and D. E. Pauls. A Comparative Analysis of Costs of Farm Collection of Milk by Can and Tank in Western Washington 1952.

Thus, the price at the dairy farm in the Basin may be at least $0.49 a hundredweight lower than the plant wholesale price in Spokane, based upon the most efficient handling system now foreseeable. Using a can system of handling, costs could be expected to be higher by an additional 21.5 cents per hundredweight and prices paid to farmers lower by the same amount, assuming average daily plant receipts of 600 hundredweight.1/

These price differences between the supply area in the eastern part of the Columbia Basin and the market in Spokane are predicated on the assumption that milk is of uniform quality in the Basin, and that no distinction is made between milk for fluid or manufacturing purposes. Indications of the effect of quality differences in milk may be obtained from the price differentials for milk classes prevailing in the Puget Sound Marketing Order. The Class I price is based on a differential added to the highest of (a) the condensery pay price; (b) a butter-powder formula price; or (c) a butter-cheese formula price. The average or blend price of Class I and Class II milk represents the average milk price received by suppliers of fluid milk. The difference between the blend price and the manufactured milk price represents the differential for quality. This differential was $1.29 cents per hundredweight in the Puget Sound market during the two years ending June 30, 1953.2/ Should a quality differential be established between milk used in the fluid milk trade in Spokane or nearby Basin markets and milk used in manufactured products, the Seattle differential is indicative of the margin that may be expected. The minimum Basin price for whole milk of manufacturing grade under an efficient marketing system would be $1.78 cents per hundredweight below the Spokane price for Grade A quality milk delivered at the plant door.

9. Milk Handling Methods

Rapid changes in methods of assembling milk from farmers are under way in Washington, as in other concentrated dairying sections of the United States--namely, in the shift from assembling milk from farmers in tank trucks instead of collecting it in cans. In May 1953, 25 plants in the Puget Sound milkshed were receiving all or part of their milk from farmers in bulk from farm tanks. Two years previously, in June 1951, when the Marketing Order came into effect, only one plant was receiving milk by the tank method. According to the latest survey, bulk tank shippers accounted for 27 percent of the producers and

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1/ Baum, E. L. and D. E. Pauls. A Comparative Analysis of Costs of Farm Collection of Milk by Can and Tank in Western Washington 1952.

2/ Milk Market Administrator's Office. Statistical Information for the Puget Sound Washington Marketing Area.

37 percent of the volume received in the milkshed. Tank shippers usually operate on a larger scale. The survey showed that tank shippers delivered 900 pounds daily per farm compared to an an average delivery of 571 pounds daily by can shippers.1/

Nearly every county in the Puget Sound milkshed today has some producers delivering milk by the farm tank method. In general, the proportion of shippers using this method increases with the distance from the market. But the daily volume delivered per producer is higher nearer the market, where the scale of operation and the geographic density of production is greater. The more extensive adoption of the tank method in the more distant portions of the milkshed is probably due to economies of bulk transport over shipping in cans.

The shift from the can to the tank method is still continuing in the Puget Sound milkshed. A similar shift is under way in other dairying areas of the state where production per farm and geographical density of production is high. Research at Washington State College explains the economics behind the rapid technological shift in milk handling methods. The comparison of can and tank procurement methods assumes an average daily shipment of 500 pounds per producer, daily collection by the can method or alternate day collection by the tank method. The summary data in Table 31 show that milk assembly costs are little different in the two methods, irrespective of the scale of operation. But substantial economies can be achieved in plant receiving by use of the tank procurement system: economies range from 27.5 cents per hundredweight at a daily capacity of 400 hundredweight to 19 cents per hundredweight at a capacity of 1,000 hundredweight per day. The bulk system will cut receiving costs by two-thirds, down to about 10 cents per hundredweight, with somewhat greater economies obtainable in the higher capacity plants.

In the Columbia Basin, where the dairy industry is in its infancy, producers will be induced to install bulk farm storage and shipping methods at an early stage. Can hauling is being done, but producers will be under pressure from a number of sources to change to bulk handling. Milk handlers have been paying a premium of 10 to 15 cents per hundredweight elsewhere in Washington for milk stored in farm tanks. Handlers will soon be converting to bulk handling systems, including tank trucks and bulk receiving at the plant, and will be inclined to discourage handling and assembling milk in cans. The growing tendency to install pipeline milking systems for economy

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1/ Marketing Service Information for Puget Sound Washington Marketing Area. A Comparison of Milk Deliveries by Cans and Farm Tanks, May 1953. August 1953, pp. 3-5.

Table 31

COMPARISON OF COSTS OF PROCURING WHOLE MILK IN CANS AND IN TANKS, PACIFIC NORTHWEST, 1952

Handling Operations	Tank Procurement (Cents per Hundredweight)			Can Procurement (Cents per Hundredweight)		
Daily volume, cwt.	400	600	1,000	400	600	1,000
Milk receiving 1/	10.5	10.0	9.0	38.0	33.5	28.0
Milk assembly 2/	31.5	26.0	21.0	30.0	24.0	20.5
Assembly and receiving 2/	42.0	36.0	30.0	68.0	57.5	48.5

1/ Baum, E. L. and others. Comparison of Costs of Receiving Milk in Cans and Tank Truck.

2/ Daily collection by can method and alternate day collection by tank method. Baum, E. L. and D. E. Pauls, "A Comparative Analysis of Farm Collection of Milk by Can and Tank in Western Washington, 1952." Figure 15, p. 28. Based on assumption of 500 pounds per shipper.

and for high quality Grade A milk and other milk products requires the use of closed bulk storage and cooling tanks. Since the dairy industry in the Basin will be geared to the Grade A fluid milk market, farm facilities will be installed as quickly as demanded by milk handlers. Necessary credit will probably be forthcoming from handlers as well as from other sources. Eventually, as the milk supply grows and exceeds local fluid milk and cream requirements, milk manufacturing facilities will be added in the Basin. Once started on the basis of bulk handling, it is not likely that the industry will revert to handling milk in cans. Economies in assembling and receiving will inevitably push the industry toward the more economical and sanitary tank method of handling milk.

B. Butter and Cheese

The butter and cheese manufactured in the Northwest is marketed principally in California. In addition, the California markets require year-round inshipments from the Midwest. The Puget Sound metropolitan area requires interregional inshipments of butter during occasional short seasons.

1. Effect of Expansion of Fluid Milk Markets

The rapid growth of the Puget Sound and Portland metropolitan markets in the war and postwar periods has had profound impact upon adjacent milk manufacturing areas. The expansion of these fluid milk markets is expected to continue; therefore, the manufacture of milk products near these markets will decline. The enlargement of the metropolitan milksheds, plus the extension of irrigation to the interior of Oregon and Washington, explains the nature of the geographical shift in dairy manufacturing now going on in the Pacific Northwest.

2. Encroachment on the Tillamook Cheese Area

The shift in manufacturing is typified by the Tillamook cheese-producing area. Prior to World War II, this was a specialized milk manufacturing area. Today, only about a third of the milk produced in the area goes into manufactured products. The balance enters the fluid milk market in Portland and neighboring communities. Milk manufacturing is still concentrated heavily upon cheese; butter is churned from the excess butterfat content of milk; and some ice cream is also made. The whey from the cheese process is partly dried and used in manufacturing cheese. Neither whole nor skim milk is processed into other products in view of the premium enjoyed by the Tillamook cheddar cheese brand and the market for fluid milk.

3. The Rate Structure

The rate structure on manufactured milk products shipped from the specialized producing areas of the Midwest is a vital

factor affecting the price relationships of manufactured milk products and between manufactured and fluid milk products in the producing points and markets of the Pacific Slope. However, an important factor in the competitive situation particularly affecting the marketing of evaporated milk and cheese is the fact that large volumes of these products are marketed under brand names which modify competition. These considerations affect the position of milk products as alternatives in production and the choice of markets in which they command the highest relative prices.

Tillamook enjoys a competitive (rail) freight advantage over Idaho in the California markets of 39 cents per hundredweight to San Francisco, and somewhat less to Los Angeles (Table 32). In contrast, by using truck transportation, Nampa, Idaho has an advantage of 39 cents per hundredweight for cheese over Tillamook in San Francisco, and more in Los Angeles. Apparently, the large movement of cheese from Tillamook contrasted with Nampa, Idaho, has resulted in a more favorable rail transportation rate. On the other hand, the truck freight rate on butter is 44 cents lower to San Francisco from Nampa, a specialized butter manufacturing area, than from Tillamook. The advantage of Nampa in the Los Angeles market is even greater.

The rail rate for the movement of butter and cheese to the large Pacific Northwest markets is much lower from Nampa than from Tillamook, a fact that may be explained by the absence of rail movement to these cities from Tillamook.

The rail rate of $1.60 per hundredweight from Columbia River Basin points to San Francisco compares with 83 cents per hundredweight from Tillamook and $1.22 from Nampa.

Such a high differential can only be explained by the lack of movement and presumably could be corrected when warranted by an adequate volume. On the other hand, the truck rate from Pasco to Seattle and Spokane is much more favorable than from Nampa.

In the event of the future development of the butter and cheese industry in the Columbia Basin, a competitive advantage will be enjoyed over the Tillamook and Idaho dairying areas in the Seattle and Spokane markets, and over Nampa in the Portland market. On the other hand, the Basin will probably continue to be at a disadvantage in the California markets in competition with Nampa, Tillamook, and lower Puget Sound butter and cheese manufacturing areas.

4. <u>Truck and Rail Competition</u>

In the flush production season butter and cheese manufactured in the Northwest are maintained in cold storage warehouses

Table 32

RAIL1/ AND TRUCK2/ TRANSPORTATION RATES FOR BUTTER AND CHEESE, OTHER THAN COTTAGE CHEESE, AS OF DECEMBER 1, 1953
(Dollars per Hundred Pounds, Minimum Weight)

Destination	Origin: Moses Lake	Ephrata	Pasco	Seattle	Nampa	Chicago	Portland	Tillamook	Plymouth	Modesto
Moses Lake										
Rail	-	-	-	-	-	-	-	-	-	-
Truck	-	-	-	-	0.60-60M	-	-	-	-	-
Ephrata										
Rail	-	-	-	-	-	-	-	-	-	-
Truck	-	-	-	-	-	-	-	-	-	-
Pasco										
Rail	-	-	-	-	-	-	-	-	-	-
Truck	-	-	-	0.60-10M	0.98-36M	-	0.60-10M	-	-	-
Seattle										
Rail	-	-	-	-	0.92-20M	3.17-24M	0.61-24M	-	3.17-24M	1.58-24M* 1.38-24M**
Truck	-	-	0.60-10M	-	0.92-60M	-	-	-	-	-
Spokane										
Rail	-	-	0.75-40M3/	-	0.92-20M	3.17-24M	0.75-40M3/	-	3.17-24M	1.58-24M* 1.38-24M**
Truck	-	-	0.55-10M	0.87-20M	0.92-60M	-	1.07-10M	-	-	-
Portland										
Rail	-	-	0.75-40M	-	0.92-20M	3.17-24M	-	-	3.17-24M	1.71-40M* 1.52-40M**
Truck	-	-	0.60-10M	-	0.92-60M	-	-	-	-	-
San Francisco										
Rail	1.60-24M	1.60-24M	1.60-24M	-	1.22-48M	3.17-24M	0.75-60M*	0.83-30M	3.17-24M	0.83-30M
Truck	-	-	-	1.56-20M	1.22-48M* 1.27-48M**	-	0.83-30M** 1.19-30M	1.66-30M	-	-
Los Angeles										
Rail	1.85-24M	1.85-24M	1.85-24M	-	1.22-48M	3.17-24M	0.75-42M* 1.10-30M**	1.10-30M	3.17-24M	1.10-30M
Truck	-	-	-	1.72-20M	1.22-48M* 1.27-48M**	-	1.45-30M**	1.74-30M	-	-
Chicago										
Rail	3.82-24M	3.82-24M	3.82-24M	-	3.82-24M	-	3.82-24M	-	0.43-24M**	3.82-24M
Truck	-	-	-	-	-	-	-	-	0.35-20M4/	-

1/ Tariff references: NPCFB Tariff No. 1-O, and 2-L
PSFB Tariff No. 1-S, 260-B, and 235
TCFB Tariff No. 1-C and 2-S
UP Tariff No. 6074

2/ Tariff references: PITB Tariff No. 9-B, 8-B, and 28
RMTB Tariff No. 30
MMTB Tariff No. 116

3/ Rate going into effect on 1/31/54.
4/ Plus surcharge of $0.50 per shipment
* Butter only.
** Cheese only.

Source: Prepared by Bishop and Bahler, San Francisco

North Pacific Coast Freight Bureau	NPCFB
Trans-Continental Freight Bureau	TCFB
Pacific Southcoast Freight Bureau	PSFB
Pacific Inland Tariff Bureau	PITB
Rocky Mountain Tariff Bureau	RMTB
Middlewest Motor Tariff Bureau	MMTB
Western Trunk Line	WTL
Union Pacific	UP

in the Seattle, Portland, and Spokane markets. There appears to be a preference for the refrigerated railroad car in shipping to San Francisco, Oakland, and Los Angeles. Rail shipment takes about a week to ten days from the Northwest to San Francisco and Los Angeles. Unpredictable delays in loading are often associated with rail shipments. Between the same points, truck transportation requires three days from the time equipment is ordered until the load is delivered.

As processed agricultural commodities, the transportation of butter and cheese between states is regulated by the Interstate Commerce Commission. However, a backhaul, or one or more legs of a triangular movement, may carry produce coming under the agricultural exemption. 1/ In this way, instances of a saving of $150 a carload have been recorded compared with charges for rail transportation from the Pacific Northwest to the Los Angeles market.

A number of factors appear to be favoring the development of truck transportation in the hauling of manufactured milk products. The truck hauling rate on butter and cheese appears to be high in comparison with the rail rate in the movement from the Northwest to the California markets; but the existence of the agricultural exemption on unprocessed commodities, plus trip leasing, reduces the rate advantage of rail transportation. In addition, the railroads are at a disadvantage because of the long time required for delivery. In some instances, this disadvantage is enhanced because of the unpredictability of arrival of the car for loading and for unloading. Physical damage to shipments resulting from poor loading is also affecting the choice of the shipper.

On occasion, receivers in the Seattle market have purchased midwestern butter at low prices in the flush season, have shipped it to Seattle for distribution and storage under the in-transit privilege, and have later shipped it to the Los Angeles market during the short season.

In regard to the in-transit privilege, it appears to be granted more freely in the movement from the Midwest over the southern part of the western region into the California markets than over the Northwestern route. Movement on a privileged basis over the railroads in the Northwest requires concurrence

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1/ Section 203 of the Interstate Commerce Act exempts unprocessed agricultural commodities from regulation.

of all the railroads and is more difficult to obtain. Another factor in truck-rail competition in the Northwest is the combination of short distance rates on trucks from any points in the Intermountain area to the Coast, which produces a relatively high rate compared with the rate an unregulated truck owner can haul for. By charging as much as the rail rate, he can gain by hauling a load to the Coast and returning empty if necessary. There is the distinct feeling in the dairy industry in the Northwest that the trucking industry has an important future in hauling manufactured milk products.

C. Canned and Dried Milk Products

1. Condensed and Evaporated Milk

It was pointed out earlier that the Pacific Slope produces an excess of condensed and evaporated milk. Production was estimated at 1,163 million pounds of whole milk equivalent in 1949, of which 556 million pounds moved into the domestic offshore and export markets, leaving an apparent local consumption of 608 million pounds. California produced more than half of the total supply. Most of the remainder was produced in Idaho, Washington, and Utah in about equal proportions.

Assuming per capita consumption equivalent to that of the United States, each of these four states produced a volume of condensed and evaporated milk in excess of requirements. Production and consumption approximately balanced in Oregon, while Arizona and Nevada were in short supply.

The Calhoun and Harrington study determined the extent of domestic offshore and export shipments.1/ Statistics are not available on the shipment of canned milk products to domestic markets in the East, but it is known that some shipments to the southeastern states have occurred. The western condensed and evaporated milk industry is clearly at a disadvantage in competing with the the midwestern dairy industry because of its location with respect to the domestic market. Besides shipments to domestic offshore and overseas markets, considerable quantities have been purchased by the Armed Forces for consumption by servicemen in Pacific installations in occupied and domestic offshore markets. Fairly large exports have also been opened up in a number of the Latin American and Central American Republics.

2. Dry Milk Powders

Skim milk powder is usually produced as a by-product of butter manufacturing; whole milk powder is manufactured in

1/ Calhoun and Harrington, op. cit.

place of butter and skim milk powder. The market for whole milk powder is relatively limited, and its manufacture is not considered a good alternative for the manufacture of butter and skim milk powder. Relatively small amounts of whole milk powder are produced on the Pacific Slope.

Regional location of production of dry milk products differs considerably from the location of the condensed and evaporated milk industry. Of the total supply of dry milk powder, 735 million pounds of milk equivalent, produced in 1949, 254 million pounds moved into the export and domestic offshore markets, leaving an apparent regional consumption of 481 million pounds. Regional location of production is considerably different for this industry. The dry milk industry, like the butter industry, is concentrated in the three northwestern states. Idaho is the dominant producing state, with Washington next in regional importance. The California market is considerably short of requirements. As a result, the main movement of this commodity is to domestic offshore markets, to the Puget Sound and Portland metropolitan centers, and to the California markets, in which the northwestern states compete with the surplus milk powder-producing areas in the Midwest.

3. <u>Competitive Freight Rates for Canned and Dried Milks</u>

Canned milk and dry milk powders usually have the same rates by rail, but rates by truck are not always the same. At present, Columbia Basin points are at a disadvantage with respect to Nampa, Idaho, the center of industry concentration in the Pacific Slope, in rail shipment of canned milk and milk powders to the Seattle market (Table 33).

This situation might be expected to correct itself in the future when the Columbia Basin reaches volume production. Pasco (in the Basin) has identical rates to both Seattle and Portland. The truck rate on canned milk from Pasco to Seattle and Spokane compares quite favorably to truck and rail rates from competitive points farther away. Obviously, shippers of these commodities in the Puget Sound area, another major producing section, have an advantage in the Seattle market. Pasco appears to have favorable rates for shipping by truck to the Portland market in competition with Puget Sound and Nampa. The present rate from Moses Lake and Ephrata (in the Basin) is high, but it could be expected to be readjusted in the future.

On canned milk shipments by truck to the California markets, Nampa is more favorably situated than Pasco and Seattle. It is probable that identical rates would apply on milk powders shipped to the California markets.

Table 33

RAIL[1/] AND TRUCK[2/] TRANSPORTATION RATES FOR CANNED MILK AND MILK POWDERS
AS OF DECEMBER 1, 1953
(Dollars per Hundred Pounds Minimum Weight)

Destination		Moses Lake	Ephrata	Pasco	Seattle	Nampa	Cedar Rapids	Chicago	Modesto
Moses Lake	Rail	—	—	—	0.45-60M	—	1.49-60M	1.49-60M	1.07-60M
	Truck	—	—	—	—	1.10-21M	3.92-21M	3.92-24M	—
Ephrata	Rail	—	—	—	0.45-60M	—	1.49-60M	1.49-60M	1.07-60M
	Truck	—	—	—	—	—	3.93-21M	3.93-24M	—
Pasco	Rail	—	—	—	0.37-40M	—	1.49-60M	1.49-60M	1.06-60M
	Truck	—	—	—	0.60-10M*	0.60-60M	4.01-21M	4.01-24M	—
Seattle	Rail	0.97-60M	0.97-60M	—	—	0.72-60M	1.49-60M	1.49-60M	0.87-60M
	Truck	—	—	0.35-21M*	—	0.68-60M	3.16-21M	3.16-24M	—
Spokane	Rail	—	0.45-60M	0.45-60M	0.45-60M	0.63-60M	1.49-60M	1.49-60M	1.07-60M
	Truck	0.97-10M	0.97-10M	0.41-20M*	0.87-20M*	{0.55-60M 0.60-60M**	3.16-21M	3.16-24M	—
San Francisco	Rail	—	—	—	—	—	1.49-60M	1.49-60M	—
	Truck	1.92-36M	1.92-36M	1.11-40M*	0.95-40M*	0.83-60M*	3.16-21M	3.16-24M	—
Los Angeles	Rail	—	—	—	—	—	1.49-60M	1.49-60M	—
	Truck	2.54-36M	2.54-36M	1.33-40M*	1.19-40M*	0.89-60M*	3.16-21M	3.16-24M	—
Portland	Rail	0.97-60M	0.97-60M	—	0.37-40M	0.63-60M	—	—	—
	Truck	—	—	0.35-20M*	—	{0.55-60M* 0.60-60M**	3.16-21M	3.16-24M	—

1/ Tariff references: TCFB Tariff No. 1-S
NPCFB Tariff No. 2-L
PSFB Tariff No. 52-F

2/ Tariff references: PITB Tariff No. 9-B, 8-B, and 28
RMTB Tariff No. 25 and 30

* Canned milk only.
** Powdered milk only.

Source: Prepared by Bishop and Bahler, San Francisco.

In view of the surplus condition for dry milk solids on the Pacific Slope, the market extends into the Mountain region. The product competes with the midwestern product as far east as Denver--at this distance, shipment is made by railroad. Trucks in some cases have met the competitive rate for a 40,000-pound minimum, but not for the 60,000-pound minimum rate. Mixed carload privileges have finally been obtained for powdered and evaporated milk, even when flavoring is added to the former, subject to a 60,000-pound minimum load. Under "Modified Rule Ten," which became effective January 1, 1954, each commodity is shipped on its separate rate as long as the minimum is met.

Livestock and Meats

A. Livestock Marketing Channels

The channels of movement of livestock marketed on the Pacific Slope vary widely for the different classes of livestock and between the Pacific and the Intermountain States. In the Pacific States 60 to 65 percent of the livestock sold by farmers and ranchers moves directly to meat packers. Only 23 to 29 percent of the sales are to other farmers and to stockers and feeders. In the Intermountain area the channels of movement are considerably less definite and more variable by livestock species. Hog marketing channels in this area more closely approach the typical channels of the Pacific Coast. About half of the hogs marketed move directly to packers and about a quarter to farmers, stockers, and feeders. In contrast, only 14 percent of the sheep and lambs move to packers; 70 percent move to other farmers and feedlots. Nearly 60 percent of the cattle and calves are shipped to the feedlots, and most of the remainder are moved directly to the packing plants.1/ In the Pacific Coast area about a fifth of the cattle and calves, and sheep and lambs are purchased directly from farmers and ranchers. About a third are purchased directly in the Intermountain area. The much smaller proportion of hog production in the western states explains the low volume of direct purchases, namely 14 and 23 percent in the Pacific and Intermountain areas respectively.

1. Livestock Slaughtering

The livestock slaughtering industry in the West is located primarily in the Pacific States. In California the industry is concentrated in Los Angeles, San Francisco, and in the Central Valley. In the Northwest the majority of plants are located in Portland and Seattle, in the Willamette Valley in Oregon, in interior points in Washington (centering around Yakima), and in Spokane in eastern Washington. In the

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1/ Abel, Harold and Dee A. Broadbent, Trade in Western Livestock at Auctions. pp. 44-47.

Intermountain States, the major concentration is around Salt Lake City and Ogden in Utah, and around Boise in Southwestern Idaho. In the Mountain States, Denver has the most important concentration of slaughtering plants. Montana has a number of scattered plants; Billings is the most important slaughtering center.

2. <u>Major Livestock Markets</u>

Over the last 25 years the fastest growing western terminal public livestock markets have been Los Angeles, Ogden, Spokane, and North Salt Lake. Next to Los Angeles and Ogden, in terms of the volume of livestock sold, are North Portland, South San Francisco, Spokane, Billings, Stockton, North Salt Lake, and Seattle.[1/] The importance of these livestock markets varies somewhat because salable livestock as a proportion of total receipts may vary considerably.

Portland is the largest of the four central livestock markets in the Pacific Northwest, followed by Spokane, Billings, and Seattle, on the basis of salable livestock receipts in the period 1941-47.[2/] The Portland livestock market is the natural gateway in the movement of livestock from the producing areas of Oregon, Northern California, Southern Idaho, and Southern Washington to the consuming centers in the Pacific Northwest.

The Old Union Stockyards of Spokane is the largest central livestock market in the state of Washington. Spokane is primarily a cattle market, although marketings of sheep, lambs, and hogs are also very important. In his studies of the Spokane market, Henry Tucker found that in 1947 livestock of all kinds and classes were drawn from a tributary area comprising: the northern counties of Idaho; the western counties of Montana, of which Missoula County is the most important; and the eastern counties of Washington extending into the interior as far as Yakima. This tributary area has a radius of approximately 175 miles.

About half the steers sold in Spokane are slaughtered, mostly in the local area. Feeder steers are the most important class of feeder livestock sold in Spokane. Most of the feeder livestock is moved to the irrigated areas of south central Washington. A secondary feeding area has also grown up in the vicinity of Spokane County. About half of the feeder calves are shipped to Yakima County and the remainder are fed in nearby

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1/ Abel and Broadbent, <u>Ibid</u>. p. 118 and Appendix A, Table 1, p. 34.
2/ Tucker, Henry. <u>Marketing Hogs and Sheep Through the Spokane Stockyards</u>, p. 5, and Henry Tucker. "Marketing Cattle and Calves Through Spokane Stockyards," p. 6.

counties. Feeder hogs are finished primarily in Spokane County. Feeder lambs are fed mostly in adjacent counties. A much smaller proportion of lambs move to the central irrigated areas, and the volume fluctuates considerably from year to year.

Hogs accounted for only about 11 percent of the total slaughter in Spokane in 1947. The majority of the hogs are shipped in from North Dakota and the Corn Belt states. Inshipments from the Midwest have been increasing, and except for small shipments to Seattle, most of the receipts are processed and consumed in the vicinity of Spokane.

The Seattle livestock market is of much more importance than its small scale would indicate. The reason is that the three principal packers in Seattle tend to make purchases in the country. In Portland the meat packers buy more of their animals from the local stockyards. Some interchange occurs between these two metropolitan centers to fill out requirements.

B. <u>Truck and Rail Competition</u>

In the long haul from the Midwest to the Pacific Slope, livestock and meats are transported almost entirely by railroad. Shipments of packinghouse products may originate somewhat farther east than shipments of livestock. In general, the relationship between freight rates on livestock and on fresh meats should result in a differentiation of supply areas between the two forms of commodities. The distance over which livestock is shipped by rail or truck is limited by the fact that live animals cannot be shipped longer than 28 hours without a stop for rest and feed, according to the regulations of the United States Department of Agriculture; and the written permission of the shipper is necessary for a shipment as long as 36 hours. While trucks are easier on livestock for short hauls, by eliminating extra transfers, railroads are easier on the animals on the long haul.

Transportation of livestock by truck in competition with railroads would appear to be almost entirely limited to four to six hundred miles. This puts the Columbia Basin generally beyond the reach of the San Francisco area, to which shipments are usually made by rail. The speed, convenience, and predictability of truck shipments at distances less than this makes truck transportation the predominant means for movements to packinghouses located near the coast in Washington and Oregon. California plants often buy live cattle as feeders or finished cattle from the feedlots in the Northwest. This southward movement is frequently the result of a backhaul.

The advantage of rail carriers is in the provision of the in-transit and diversion privileges. All of these are important features of the longer distance movements, but in-transit feeding

is perhaps the most important. Animals are brought to the initial market yard with a billing on the probable points for on-movement. If the final destination is a packinghouse the animals would move under the "testing the market" privilege. After sale, they move directly to a packinghouse or to a feedlot en route.

An in-transit stop for feeding costs $12.10 per carlot and requires a minimum of one month's stopover. The rail rate on feeder cattle to the feedlot is 85 percent of the rate for fat cattle. It is quite a common practice in California to ship cattle to the feedlot at the lower rate without the in-transit privilege and to continue the movement of the fattened cattle to the market or slaughterhouse by truck. This may be cheaper (or more convenient) than to incur the in-transit charge plus the higher rate on fat cattle.

The charge on the in-transit privilege for "testing the market," involving several days' stop, is cheaper than the charge for in-transit feeding. The in-transit privilege does not carry through to the slaughterhouse and to the packinghouse product. The in-transit privilege for testing the market is important in the Stockton and Spokane markets before animals are moved on to feedlots or to packinghouses in the coastal cities.

The diversion privilege may also be used by the packer to delay his animals in a feedlot, in expectation of an improved price situation, where a change in ultimate destination is involved.

For movements of livestock and fresh meats in California and in the Northwest, truck transportation appears to be preferred. Even though the basic rates may be the same, livestock can be moved by truck with less shrinkage and lower feed prices. The shorter transit time on fresh products also creates an advantage. Shippers usually aim for slaughter one day and delivery of meat the next. Achieving a saving in time and in refrigeration charges creates an advantage in favor of trucks.

Movement by rail from interior parts of the Northwest to Seattle or Portland may take at least 36 hours; shipment to California points from the Northwest may take two days longer by train than by truck. Packinghouse products are shipped almost exclusively by trucks by some companies because of the saving in time.

C. Refrigeration

Some companies prefer to use their own refrigerator cars. They consider ice refrigeration sufficient for meat products which should be kept below 36° Fahrenheit. Some shippers believe mechanical refrigeration in trucks is not dependable, and that dry ice refrigeration causes discoloration of meat. Trucks carry quartered

beef on racks easily installed in the roof, and smaller cuts are carried in boxes, which are stacked in racks to allow circulation around and under them.

Refrigeration costs are an additional expense in rail transportation. In shipping fresh meat from Omaha to San Francisco and Spokane, the maximum refrigeration charge is $123 per car in summer and $87 in winter (for two icings).

D. Transcontinental Freight Rates[1/]

Transcontinental rates apply on freight movements between the territory west of the Rocky Mountains and the territory east of an irregular line extending north from El Paso, Texas, through Denver and Cheyenne, and following the eastern Montana boundary to the Canadian border.

Transcontinental territory comprises California, Oregon, Washington, northern Idaho, Arizona, Nevada, and western parts of Utah and New Mexico. The area is divided further into North Coast Territory and South Coast Territory by an east-west boundary passing through northern California.

The transcontinental rates in general outline are based upon the distance principle and are in conformance with the "Long and Short Haul Clause" of Section 4 of the Interstate Commerce Act. The rates apply in one direction only on the majority of the commodities moving in transcontinental traffic, but with few exceptions, rates on livestock shipments are granted "between" points in the two territories, meaning that the same rates apply in both directions.

1. Livestock Rates to the North Coast

In westbound shipments, points in transcontinental North Coast Rate Territory are arranged in three zones. Rate Basis 1 is the most westerly zone, including Seattle and Portland, as well as other points. Rate Basis 2 is to the interior immediately to the east, and Rate Basis 3 covers most eastern Oregon and Washington points. With few exceptions, transcontinental rates on a given commodity are the same to any of these zones of destination from any group of points in the midwestern or eastern parts of the United States.

2. Livestock Rates to the South Coast

Minneapolis and St. Paul are parity, or equality, points with respect to rates on livestock and meat products shipped

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1/ This section on livestock and meat freight rates draws heavily upon W. H. Dreesen's Transportation Rates on Livestock and Meat Products in Western States.

to the California markets. Rates from Minnesota and North and South Dakota points are lower to San Francisco and northern California points than to southern California points. In contrast, the rate levels are reversed for shipments originating in more southerly points in Trunk Line Territory in the Central States.

3. Livestock and Fresh Meat Rate Relationships

There is much concern in the western livestock industry over the relationship between rates for livestock and fresh meat. When reduced to an equivalent weight basis, including livestock shrinkage in transit, the rates are approximately the same. It is contended that in a proper relationship the fresh meat rate should be 140 percent and the rate on other packinghouse products should be 120 percent of the rate on livestock.

Without entering into the merits of the controversy, a favorable rate on processed meats favors the development of processing facilities in the Midwest. On the other hand, the relatively favorable rate on the movement of livestock to the western states encourages the development of processing facilities in that area.

A close relationship between rates for live and processed meats generally makes it uneconomical to ship processed meat back in the opposite direction to the main stream of livestock movement. Packing plants are located in the general area of origin. Meats can be shipped on in the main stream of the livestock movement without severe freight penalty, as long as the two freight rates are close.

The relationship between transportation rates on livestock and fresh meats and other packinghouse products is important in determining the form in which these commodities are shipped. This rate structure exerts a profound effect on the location of the meat packing industry, and is in turn affected by it once a locational pattern has become established.

As of January 1950, the eastbound rates from Western Trunk Line Territory and Southwest Territory destined for Chicago showed a fresh meat rate 106 percent of the livestock rate; the rate on other packinghouse products was equal to the livestock rate. Corresponding rates in shipments to New York City were 145 and 102 percent, respectively, of the livestock rate.

In westbound shipments, from Western Trunk Line Territory to South Coast destinations, the rates for fresh meat and other packinghouse products were 152 and 126 percent, respectively,

of the livestock rate on shipments from the parity points.[1] Westbound shipments of fresh meats and other packinghouse products from Western Trunk Line Territory to North Coast points averaged 166 and 138 percent, respectively, of the livestock rate. The rate on fresh meats was 120 percent of the rate on other packinghouse products. The rate on each of these products is identical to Portland, Seattle, and Spokane. On livestock, the westbound rate to Spokane from selected midwestern points in January 1950 was 19 to 24 cents lower than the rate to Portland, Seattle, and Tacoma. Thus, the freight rate on packinghouse products is relatively less favorable than the livestock rate on shipments to Spokane, than to the coastal cities. The rate relationship of processed meats to livestock declines with distance from the Northwest in shipments from midwestern points.

E. Intraregional Freight Rates

1. Rates in North Coast Territory

Parity territory in livestock movements to the Portland and Seattle terminals includes Colfax, Pasco, Spokane, and all Montana points. Points in Washington north of this territory, and northern Idaho points have a lower rate to Seattle and other Puget Sound markets. Points in Oregon, southern Washington, and southern Idaho enjoy a lower rate to Portland. Columbia Basin points, other than Pasco, are more favorably situated with respect to Spokane and Seattle than to Portland (Table 36).

Livestock freight rates between designated points in Oregon, Washington, Idaho, and western Montana to Spokane, Seattle, and Portland apply equally in both directions and are based on the distance principle. Shipments between Montana points and Spokane usually move at 60 to 70 percent of the rates between Montana and the coastal terminals, with a lower rate to Seattle than to Portland.

Truck rates are more complex. Rates vary with minimum weight requirements, which may vary with different kinds of livestock. Usually, rates on truckload shipments are higher than those on corresponding shipments by railroad.

2. Rates Between North and South Coast Territory

Freight rates between Northwestern and Utah points and California points are also consistent with the distance principle.

1/ The percentage spread between livestock and processed meats was reduced by approximately 35 percent, effective November 10, 1945, on westbound shipments from Western Trunk Line Territory. W. H. Dreesen, Ibid. p. 21, Fn. 1, ICC Docket 28978.

Table 34

RAIL TRANSPORTATION RATES FOR FAT LIVESTOCK1/
AS OF DECEMBER 1, 1953
(Dollars per Hundred Pounds, Minimum Weight)2/

	Origin															
Destination	Moses Lake	Pasco	Ephrata	Pendleton	Pocatello	Twin Falls	Elko	Ogden	Missoula	Billings	Miles City	Denver	Kansas City	Omaha	Bismark	St. Paul
Moses Lake	-	-	-	0.64	1.41	1.44	1.70	1.51	0.68	1.02	1.29	1.50	1.71	1.71	1.37	1.58
Pasco	0.61	-	0.43	0.32	1.14	1.12	1.56	1.25	0.74	1.04	1.33	1.48	1.70	1.70	1.44	1.56
Ephrata	-	-	-	0.49	1.35	1.32	1.64	1.46	0.69	1.02	1.29	1.48	1.85	1.85	1.39	1.59
Spokane	0.46	0.47	0.44	0.53	0.95	0.98	1.24	1.05	0.59	0.91	1.21	1.39	1.62	1.62	1.22	1.51
Seattle	0.59	0.60	0.58	0.66	1.10	1.05	1.44	1.18	0.87	1.14	1.41	1.64	1.89	1.89	1.48	1.73
Portland	0.76	0.59	0.67	0.58	1.04	0.99	1.13	1.13	0.91	1.18	1.50	1.64	1.89	1.89	1.48	1.73
San Francisco	1.33	1.10	1.24	1.18	1.12	1.04	0.90	1.04	1.36	1.51	1.62	1.55	1.84	1.84	1.82	2.02
Los Angeles	1.62	1.39	1.48	1.50	1.18	1.12	1.17	1.18	1.50	1.58	1.70	1.41	1.76	1.76	1.91	2.02

1/ Cattle, single deck; calves, hogs, and sheep, doubledeck.
Tariff reference: TCFB Tariff No. 52-H
PSFB Tariff No. 220-D
NPCFB Tariff No. 69-B
UP Tariff No. 6013-D

2/ Minimum weights: 37'6" cabs and under: cattle and hogs 24M; calves 23M; sheep 20M
37'6" cabs and over: subject to size of car order and/or used.

Source: Bishop and Bahler, San Francisco, Rates in effect, December 1, 1953.

Table 35

RAIL1/ AND TRUCK2/ TRANSPORTATION RATES FOR FRESH MEAT
AS OF DECEMBER 1, 19533/
(Dollars per Thousands of Pounds)

Destination	Origin: Moses Lake	Ephrata	Pasco	Seattle	Spokane	Portland	San Francisco	Los Angeles	Odgen	Denver	St. Paul	Omaha	Kansas City
Moses Lake													
Rail	-	-	-	0.90-21M	-	0.90-21M	1.85-20M	2.17-20M	-	2.60-20M	2.78-20M	2.78-20M	2.90-20M
Truck	-	-	-	0.64-21M*	0.64-21M*	-	-	-	-	-	-	-	-
Ephrata													
Rail	-	-	-	0.69-21M	0.69-21M	0.69-21M	1.85-20M	2.17-20M	1.97-20M	2.60-20M	2.78-20M	2.78-20M	2.90-20M
Truck	-	-	-	0.64-21M*	0.64-21M*	-	-	-	-	-	-	-	-
Pasco													
Rail	-	-	-	0.69-21M	0.69-21M	0.69-21M	1.79-20M	2.08-20M	1.97-20M	2.60-20M	2.78-20M	2.78-20M	2.90-20M
Truck	-	-	-	-	0.64-21M*	0.64-21M*	-	-	-	-	-	-	-
Seattle													
Rail	0.90-21M	0.69-21M	0.69-21M	-	0.69-21M	0.56-15M	1.50-20M	1.82-20M	2.07-20M	2.60-20M	2.78-20M	2.78-20M	2.90-20M
Truck	0.64-21M*	0.64-21M*	0.64-21M*	-	0.64-21M*	-	-	2.84-24M	2.25-21M	-	3.47-25M	4.07-30M	-
Spokane													
Rail	-	0.69-21M	0.69-21M	0.69-21M	-	0.69-21M	1.85-20M	2.17-20M	1.97-20M	2.60-20M	2.78-20M	2.78-20M	2.90-20M
Truck	0.64-21M*	0.64-21M*	0.65-21M*	0.64-21M*	-	0.64-21M*	-	-	2.18-21M	-	3.47-25M	-	-
Portland													
Rail	0.90-21M	0.69-21M	0.69-21M	0.60-21M	0.69-21M	-	1.35-20M	1.67-20M	1.97-20M	2.60-20M	2.78-20M	2.78-20M	2.90-20M
Truck	-	-	0.64-21M*	-	0.64-21M*	-	1.78-21M	-	2.18-21M	-	3.47-25M	-	-
San Francisco													
Rail	1.85-21M	1.85-21M	0.79-21M	1.50-21M	1.85-21M	1.35-21M	-	0.66-20M	1.93-20M	2.60-M	2.78-20M	2.78-20M	2.90-20M
Truck	2.29-20M	2.29-20M	2.29-20M	1.63-20M	2.29-20M	1.19-20M	-	-	1.55-20M	2.30-32M	-	3.18-30M 3.00-30M**	3.20-25M 3.00-25M**
Los Angeles													
Rail	2.17-21M	2.17-21M	2.08-21M	1.82-21M	2.17-21M	1.67-21M	0.66-20M	-	1.93-20M	2.60-20M	2.78-20M	2.78-20M	2.90-20M
Truck	2.19-21M*	2.19-21M*	2.19-20M*	1.83-20M	2.19-21M*	1.51-20M	-	-	1.55-20M	2.30-32M	-	3.18-30M 3.00-30M**	3.05-25M 2.85-25M**

1/ Tariff references: TCFB Tariff No. 1-C; PSFB Tariff No. 1-S; PSFB Tariff No. 260; NPCFB Tariff No. 1-0; NPCFB Tariff No. 2-L; UP Tariff No. 6074

2/ Tariff Reference: PITB Tariff No. 8-B; PITB Tariff No. 9-B; PITB Tariff No. 28; RMTB Tariff No. 25

Source: Bishop and Bahler, San Francisco
* Excludes loading and unloading
** Meat not hung or racked.

Table 36

RAIL1/ AND TRUCK2/ TRANSPORTATION RATES FOR PACKINGHOUSE PRODUCTS AS OF DECEMBER 1, 19533/
(Dollars per Hundred Pounds, Minimum Weight)

Destination	Origin: Moses Lake	Ephrata	Pasco	Seattle	Spokane	Portland	San Francisco	Los Angeles	Ogden	Denver	Omaha	Kansas City	St. Paul
Moses Lake													
Rail	-	-	-	0.58-30M	-	-	1.50-30M	1.76-30M	-	2.16-30M	2.32-30M	2.42-30M	2.32-30M
Truck	-	-	-	-	-	-	-	-	-	-	3.39-30M	-	-
Ephrata													
Rail	-	-	-	0.58-30M	0.58-30M	0.58-30M	1.50-30M	1.76-30M	1.59-30M	2.16-30M	2.32-30M	2.42-30M	2.32-30M
Truck	-	-	-	-	-	-	-	-	-	-	3.39-30M	-	-
Pasco													
Rail	-	-	-	0.46-30M	0.58-30M	0.46-30M	1.41-30M	1.69-30M	1.59-30M	2.16-30M	2.32-30M	2.42-30M	2.32-30M
Truck	-	-	-	0.64-20M*	0.53-30M4/	0.53-30M4/	-	-	-	-	3.39-30M	-	-
Seattle													
Rail	0.58-30M	0.58-30M	0.46-30M	-	0.58-30M	0.44-30M	1.25-30M	1.52-30M	1.69-30M	2.16-30M	2.32-30M	2.42-30M	2.32-30M
Truck	0.53-30M4/	0.53-30M4/	-	-	-	-	-	2.06-36M**	-	-	3.39-30M	-	-
Spokane													
Rail	-	0.58-30M	0.58-30M	0.58-30M	-	0.58-30M	1.50-30M	1.76-30M	1.59-30M	2.16-30M	2.32-30M	2.42-30M	2.32-30M
Truck	-	-	0.53-30M4/	0.53-30M4/	-	-	-	2.40-36M**	1.79-21M	-	3.39-30M	-	-
Portland													
Rail	0.58-30M	0.58-30M	0.46-30M	0.44-30M	0.58-30M		1.12-30M	1.39-30M	1.59-30M	2.16-30M	2.32-30M	2.42-30M	2.32-30M
Truck	-	-	-	-	-	-	-	1.91-36M**	1.79-30M	-	3.39-30M	-	-
San Francisco													
Rail	1.50-30M	1.50-30M	1.41-30M	1.25-30M	1.50-30M	1.12-30M	-	0.58-30M	1.59-30M	2.16-30M	2.32-30M	2.42-30M	2.44-30M
Truck	-	-	-	-	1.86-30M***	-	-	-	1.55-20M	2.07-30M	2.75-30M	2.75-30M	-
Los Angeles													
Rail	1.76-30M	1.76-30M	1.69-30M	1.52-30M	1.76-30M	1.39-30M	0.58-30M	-	1.59-30M	2.16-30M	2.32-30M	2.42-30M	2.44-30M
Truck	-	-	-	-	-	-	-	-	1.55-20M	2.07-30M	2.75-30M	2.65-30M	-

1/ Tariff references: TCFB Tariff No. 1-C, PSFB Tariff No. 1-S, PSFB Tariff No. 260, NPCFB Tariff No. 1-0, NPCFB Tariff No. 2-L, UP Tariff No. 6074.
2/ Tariff references: PITB Tariff No. 8-B, PITB Tariff No. 9-B, PITB Tariff No. 28, RMTB Tariff No. 25.
3/ Prepared by Bishop and Bahler, San Francisco
4/ Does not include loading and unloading.

* Applies only on lard, lard substitutes, shortening, and cooking oils.
** Applies only on meats frozen, cooked, or preserved.
*** Applies only on lard and lard compounds.

For example, Oregon-Los Angeles and Idaho-Los Angeles rates are higher than the rates between points in these states and San Francisco. Oregon to San Francisco rates are higher than Oregon to Sacramento rates, and Oregon to Stockton rates are between these two.

The relative advantage of Columbia Basin points in the southbound movement to California may be of interest in this connection. Moses Lake, Pasco, and Ephrata, in the Basin, enjoy lower rates than the major Montana stockyard terminals on shipments to San Francisco and Los Angeles. But Ogden, Utah, has lower rail rates to these California markets. Pasco, in the Basin area, and Pocatello, Idaho, have about the same rate to San Francisco. Otherwise Southern Idaho points have an advantage in Los Angeles and San Francisco. Pasco and Ephrata have lower rates to these markets than Pendleton, one of the important competing points in Oregon.

F. The Future of the Livestock Industry in the Columbia Basin

The raising of livestock should offer real promise in the Columbia Basin for a variety of reasons. The cultivation of pasture grasses, including alfalfa, is well suited to the area. Wastes from the processing of agricultural products, such as sugar beet pulp, sweet corn husks, and cobs, are likely to become available in increasing supply, and can be expected to provide a cheap source of feed.

It does not appear that feeding will develop immediately as a side-line for many farmers. Most of the settlers in the Basin are relatively inexperienced in feeding livestock, and considerable capital is required in the fattening of feeder cattle. Finally, the relatively high price of feed grains will deter feeding of livestock. It seems to be rather generally agreed in the Northwest that the high support price for wheat in recent years has made wheat too expensive a source of feed. There is the suggestion that a livestock industry could be based considerably upon the cultivation of corn. However, feed corn is a relatively difficult crop for farmers to raise in this area. The production of corn for solids is already practiced, and tests on feed corn are continuing. The long-term outlook for feed corn appears to be favorable, if the problem of a high moisture content can be controlled by dehydration, for example. On the other hand, if the moisture content is not effectively controlled, farmers will be induced to feed corn directly on a small-scale basis. Consideration is being given to setting up dehydrating facilities in the Basin or in the Puget Sound area.

As a rule, livestock feeding based on the use of processing wastes is operated on a large scale. The present prospect is that this pattern of organization, based upon large capital requirements, will continue. But many farmers may be expected to feed on a smaller scale, basing their livestock economy not upon processing wastes, but upon grain and pasture crops.

The production of hogs should be one of the most promising livestock enterprises in the early stages of the development of the Basin. Hog raising requires relatively small capital and limited facilities, and is well suited to small-scale enterprise. The development of a cattle industry based upon pasture and forage crops also should be extremely beneficial to the Basin because of the rotational value of these crops in the agricultural enterprise.

Members of the industry seem to feel that livestock packers might reasonably exert more effort in encouraging farmers toward developing the hog industry. If properly stimulated, it might offer one of the best livestock opportunities in the Basin. Hogs may enjoy the best regional competitive position of any livestock enterprise. The high mortality in shipping live hogs from the Corn Belt would seem to favor the production of hogs in the Basin.

1. Feeding in the Yakima Valley

An illustration of the opportunities in feeding in the Columbia Basin may be found in the developments in the Yakima Valley. According to the most recent figures, 24,000 head of feeder cattle are located in the Yakima district. In this irrigated valley were located 94 percent of the feeder cattle population of the state, according to the 1950 Census. From the standpoint of feeding, this district has every natural advantage including plentiful wastes from sugar refineries and other food processing plants, a growing supply of corn, and a relatively short truck haul to the Coastal packing plants. Artificial drying is already being done to some extent. Relatively high price of wheat supports have hindered progress in the hog industry. However, with further developments in corn production, it should be possible to increase hog production again.

Feeder cattle are obtained from tributary Oregon and Washington points, particularly from the Spokane market. Movement in and out of the valley is by truck. Of the hogs originating in the Yakima area, an estimated 70 percent are slaughtered in Seattle, and most of the rest are slaughtered in Portland.

2. In-transit Feeding in the Columbia Basin

It appears that livestock feeding could be stimulated in the Columbia Basin by additional facilities for holding and feeding cattle which could be brought in from distant ranges in Montana and Idaho. More rail facilities in the Basin, plus feedlot terminal facilities, would encourage the use and the economy of the in-transit privilege, so that the livestock could move on directly after fattening to the Puget Sound markets instead of competing in a backhaul to Spokane. The

in-transit type of arrangement may be the main hope of the railroads in keeping some of the business in view of relatively better truck service to Coast points. In addition, of course, supplies of feeder livestock for the irrigated feedlots in the Columbia Basin will also be obtainable from ranges in central and southeastern Washington.

It is unlikely that the in-transit privilege based upon Spokane is going to be advantageous to the Columbia Basin. Ordinarily, for a short run from the feeding area to the market, it pays to use the in-transit privilege as long as the additional charge on the shipment of fat cattle does not exceed the cost of the in-transit privilege freight rate on feeder cattle. An alternative would be the shipment of fat cattle on to the slaughterhouse in the Puget Sound area or to Spokane by truck.

3. Meat Packing in the Columbia Basin

The possibility of packing meat in the Columbia Basin depends on several competitive factors. The Basin is well situated for making competitive shipments of meat to the Coastal cities. However, good-sized packing capacity is being developed in the vicinity of Yakima, based on the substantial livestock operations located there. In the interests of economy, it would seem that additional packing facilities in the Columbia Basin would not appear to be justified in the early stages of development.

Potatoes

A. Northwestern Potato Growing Areas

The potato-growing industry of the Northwest is based upon irrigation, and potential growth in potato production is a direct function of the future expansion of irrigation.

At present the Idaho potato industry is concentrated in the counties surrounding Idaho Falls, Twin Falls, Burley, and Rupert. The Boise area is not as important yet but has prospects for much further development. These Idaho potato growing areas overshadow in importance the potato areas of the two neighboring states (Table 37).

The principal centers of production in Oregon are Deschutes, Klamath, and Malheur counties. The Malheur growing area is part of the Lower Snake River development centering about Vale in eastern Oregon near Payette, Idaho. Production in Jefferson County, immediately east of the Cascade Range, is small but growing. The irrigation economies of Klamath and Deschutes have not yet reached maturity, and further growth may be anticipated.

Table 37

SALES AND CONSUMPTION OF POTATOES BY FARMERS AND SURPLUS OR DEFICIT IN THE NORTHWEST AND THE UNITED STATES 1952 AND PROJECTED 1963 (Millions of Bushels)

Area	Sales by Farmers and Farm Consumption 1/				Surplus or Deficit 2/	
	1952	1963 3/			1952	1963
		Estimated From Trend	New Irrigation	Total		
Washington	8.6	10.2	11.3	21.5	+ 4.5	+16.6
Oregon	9.2	17.3	0.4	17.4	+ 6.6	+14.5
Idaho	34.4	54.5	2.3	56.8	+33.4	+55.7
Total Northwest	52.2	82.0	14.0	96.0	+44.5	+86.8
Percent of United States	18.6	--	--	28.6	--	--
Total United States	280.0	--	--	335.0	4/	4/

1/ Does not include potatoes used for seed or feed, or amount lost due to shrinkage or other causes. Data for 1952 based on 1951 relationship of production to sales and farm household consumption, Agricultural Statistics, 1952, and Crop Production, October 1, 1953, U. S. Department of Agriculture, Bureau of Agricultural Economics.

2/ Sales and farm household consumption less consumption calculated by per capita rate and population. 1952 per capita consumption from The Food Situation, U. S. Department of Agriculture, Bureau of Agricultural Economics, Oct.-Dec. 1953; 1963 per capita consumption based on Daly, op.cit., high employment 1970 figure adjusted to 1963. Population estimates by Stanford Research Institute.

3/ Estimated by logarithmic projection of 1924-29 average and 1947-52 average, Western Resources Handbook, Stanford Research Institute.

4/ U. S. consumption is assumed to equal production.

Up to the time of the development of the Columbia River Basin Project, the potato industry in Washington was located in the irrigation projects around Yakima and Ellensburg (Kittitas County). In 1952 Grant County in the Basin shipped twice the volume of the latter (Table 38), although it still shipped only half the volume of Yakima County.

1. Potato Movements in the Northwest

It has been pointed out that Idaho is one of the three principle potato shipping states in the nation. California, Maine, and Idaho shipped about 15 percent each of the domestic potatoes marketed in 1952. Altogether the three Northwestern States shipped a quarter of domestic potato unloads.

The potato industry is of major significance in the fruit and vegetable trade of the Northwest. In Idaho, potato shipments accounted for over 85 percent of the total volume of fruits and vegetables shipped in the state in 1952 (Table 38). In Oregon, potatoes amounted to nearly half of the shipments of fresh produce. In Washington the potato crop accounted for about a quarter of total shipments and was much overshadowed in volume by fruit crops.

Washington is a surplus potato-producing state, but receives rather large seasonal inshipments from California. Good-sized inshipments also come from Idaho and Oregon.

Washington produces early as well as late potatoes. The bulk of the crop is shipped between July and October. Fall and winter storage volume is relatively low, and shipments are reduced to a trickle in the spring months. The seasonality of Oregon marketings is quite similar. Idaho is primarily a late potato state. Peak potato marketings are nearly two months later in Idaho and the flow to market continues heavily through March.

Competition from the Maine potato growing areas does not become severe in the eastern markets until October and November. The heavy flow of Maine potatoes extends through April and May. Heavy marketings of early white potatoes from the California Central District are made in May and June when Northwestern storage supplies are nearly exhausted.

At this time a reverse movement to the Northwest occurs from California. The southward movement to California takes place in the winter months. Shipments of California late potatoes from the Northern District coincide approximately with Idaho marketings, but are much smaller in volume.

Table 38

CARLOT SHIPMENTS OF POTATOES, VEGETABLES, AND FRUITS
FROM SELECTED COUNTIES OF THE PACIFIC NORTHWEST STATES, 1952

Origin		Potatoes	Other Vegetables	Fruits	Total
Washington					
	Adams	--	--	--	--
	Franklin	--	--	--	--
	Grant	2,148	518	9	2,675
	Kittitas	1,062	12	--	1,074
	Yakima	4,210	299	8,375	12,884
	Other	1,530	678	13,902	16,110
	Total	8,950	1,507	22,286	32,743
Oregon					
	Deschutes	1,453	--	--	1,453
	Jefferson	1,152	--	--	1,152
	Klamath	2,980	10	--	2,990
	Malheur	3,704	1,873	--	5,577
	Other	631	2,184	6,949	9,764
	Total	9,920	4,067	6,949	20,936
Idaho					
	Bingham	10,437	58	--	10,495
	Bonneville	6,756	--	--	6,756
	Cassia	2,693	--	--	2,693
	Fremont	3,150	24	--	3,174
	Jefferson	3,018	--	--	3,018
	Jerome	2,228	24	--	2,252
	Minidoka	2,647	--	--	2,647
	Twin Falls	5,710	160	47	5,917
	Other	6,667	3,959	3,125	13,751
	Total	43,306	4,225	3,172	50,703

Source: U. S. Department of Agriculture, Production and Marketing Administration. Carlot Shipments of Fresh Fruits and Vegetables, Calendar Year 1952.

2. <u>Truck and Rail Competition</u>

As a general rule choice between rail and truck is a matter of dollars and cents to the shipper; but related factors, such as convenience, timing, and weather conditions are also important factors in the choice. For example, the present movement of potatoes from the Klamath Falls area to San Francisco is entirely by rail because of the winter weather en route. Winter movement requires the "Protective Services" of the railroad involving the installation of heating units in the cars to prevent freezing. Similarly, refrigeration is important for early potatoes which must move rapidly to market over a long rail haul.

Frequently truck haulage directly to the market is more convenient and cheaper, all things considered. A helpful feature of the service rendered by the trucker is the willingness to make multiple delivery stops disposing of a single truck load. Another important advantage of the trucker is the usual overnight delivery service from the grower to the market. The speed and convenience of truck movement offers a real advantage to the shipper. In shipments to the California markets there is an impression of a lack of control of the car by railroad, and the rail haul requires seven days. In contrast, there is overnight truck service from Yakima to San Francisco. A reason for making rail shipments into the Oakland market is to use the in-transit privilege in order to test the market. San Francisco, on the other hand, is usually at the end of the line for in-transit privileges.

The diversion privilege offered to the shipper by the railroad for shipments to the East is an important competitive feature. Washington potatoes are not usually sent to eastern markets without a buyer. On the other hand, the volume of Idaho potatoes compels shippers in this area to send east in the course of a season a substantial number of "rollers," that is, cars that are en route while the shipper is looking for a buyer. The diversion privilege permits the shipper to change the destination while moving the car in the same general direction. The service advantages of rail shipments include not only in-transit and diversion privileges, which are important in shipment to the East, but also the "stop car" arrangement. Under this arrangement, a car consigned to a single buyer can be stopped for partial off-loading to another buyer en route. A similar arrangement is possible while the car is en route. Disadvantages of the arrangement lie in the extra charges, and the necessity of reordering the movement on from the first unloading point. It also raises questions of responsibility for shortage and for ultimate payment of the single freight charge.

Diversions are commonly used in the potato business; usually the shipper has four diversions free of charge, and the fifth is charged at the local rate, unless it is made while the car is still en route. Storage of potatoes in transit, usually cold storage, is of real advantage for rail movement destined for California markets. It is also a rather common practice in the California markets to use the rail car for short periods, for convenient and not too expensive storage space.

A related advantage of rail transportation, particularly in potato movements to the East in which the diversion privilege is involved, is in the elaborate system of reporting by the railroad which makes it relatively easy to trace a rail car and to predict the arrival time of a rail shipment. In shipments from the Northwest to the California markets, where less control is involved, the receiver may sometimes find an advantage in delayed arrival, and may occasionally choose rail services for this reason.

B. Future Supply-Consumption Situation in the Columbia Basin

A recent Bureau of Reclamation census of agricultural production in the Columbia Basin found that 462 carloads of potatoes were produced in 1952. At mature development of the 600,000-acre program, the Bureau estimates production of 11,750 carloads. Conditions in the Basin are very favorable for the production of potatoes, as they are generally in the irrigated areas of the Northwest. An increase in production from this area alone would more than double shipments from potato areas in the state of Washington. In order to put developments in the Basin in perspective, an attempt has been made to project potato production in the competing Northwest States. The trend of production in the three states is projected logarithmically from the high employment periods of 1924-29 and 1947-52 and added to the production that may be anticipated directly from bringing lands under irrigation.1/ This analysis probably overstates the future importance of the Northwest in the domestic potato trade. Nevertheless, it indicates the economic framework for the potato industry in the Columbia Basin.

According to the indicated trend, the Northwestern potato industry may increase its share of the national output from 18.6 in 1952 to 28.6 percent of the total in 1963. Taking account of future population increases, the 1963 surplus of the Northwest may be nearly double the present level of 44.5 million bushels. The Washington surplus may expand from 4.5 to 16.6 million bushels, a future surplus of about 25,000 carloads.

1/ This includes the known program of the Bureau of Reclamation and private ground water development in Idaho referred to earlier.

Assuming the same seasonal production pattern in Washington, there are prospects that potato growing areas in the state would be able to supply completely the markets in the state by storing potatoes into the winter and spring months. Some early commercial potatoes from California may be received in May and June, the low supply season, but inshipment may only be the consequence of a definite preference for early white potatoes.

1. Competitive Aspects of the Potato Market with Respect to the Columbia Basin

The early White Rose variety of potato, grown in limited quantity in the Basin, is harvested in July, August, and September. The later Russets are harvested heavily from August through November, and the supply is usually exhausted by April.1/ During the peak of the harvesting season in the Columbia Basin and in the Northwest, potatoes generally move to eastern markets. Columbia Basin potatoes are at a disadvantage in competing with the Idaho prices of 14 cents per hundredweight in Chicago, 9 cents in New York City, and 4 cents in Boston (Table 39). The potato harvesting season is a little earlier in the Columbia Basin and in Washington, generally, than in Idaho. Peak shipments are made in July and August; in Idaho the peak movement is not reached until September.

The peak in the shipment of California early potatoes is in May and June. The shortness of the season results in a very large peak movement. A delay in the California harvest has a decided effect in slowing up the market for potato shipments to Chicago, New York, and Boston from the Basin, in spite of the fact that the Basin enjoys an advantage over California of 5 cents per hundredweight.

During winter, Columbia Basin potatoes move principally to Seattle and Spokane; in shipments to these markets, the Basin has a freight rate advantage ranging from $0.29 to $1.12 over potatoes originating in Idaho points and Klamath Falls, Oregon.

Potatoes can be shipped to Portland at 7 cents per hundredweight less than from Klamath Falls, but Columbia Basin potatoes do not appear to sell as well in Portland as Klamath potatoes. The Basin is at a sharp disadvantage in marketing potatoes in California compared to Klamath Falls, and at a somewhat lesser disadvantage in competing with Idaho points (Table 39). Competitive shipment to the California markets appears to be dependent upon a low backhaul rate possible under the agricultural exemption. Some truck movement to California apparently does occur from the Basin. Contract Rates of 80 to 90 cents per hundredweight to San Francisco and $1.15 cents per

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1/ Information from the Washington Potato Shippers Association, Yakima, Washington.

hundredweight to Los Angeles are far under the regular fourth class truck rate and slightly under the rail rate. Success in the California markets also depends much on timing the arrival of supplies carefully in relation to the seasonality of shipments from nearby competing areas.

Next to the Yakima Valley, the Columbia Basin has the most favorable rates on shipments to the large potato markets in Seattle, Portland, and Spokane. Areas having the next most favorable rates are the irrigated areas of central Oregon and Washington just east of the Cascades. But the Columbia Basin area is unfavorably located for shipping to California and eastern markets. The competitive situation of the Columbia Basin in the potato market is principally due to its position relative to the three other major western producing areas, each of which has freight advantages in certain directions.

Besides the disadvantage of location, shippers in the Columbia Basin will also need to contend with the preference now attached by consumers to potatoes from certain growing areas in the Northwest. Klamath Falls potatoes appear to command a premium over Basin potatoes in the Portland market due to a local preference. Studies of the question indicate that Idaho and California potatoes bring premiums over potatoes from other areas shipping to eastern markets.

Church found these premiums quite substantial. The wholesale price differential in Idaho potatoes over transportation charges was 34 cents per hundredweight in New York City and 14 cents in Chicago in the period 1942-48.[1/] Apparently no differential existed in the Los Angeles market. Undoubtedly some of the differential is attributable to certain unaccounted-for costs of shipping. Nevertheless, there is little doubt of the existence of a premium on Idaho potatoes.

2. Rail and Truck Competition

In shipping Columbia Basin potatoes to Seattle, choice of rail or truck transportation seems to depend much on the preference of the buyer or the seller of the potatoes. A somewhat higher proportion of the potatoes shipped to the nearby markets move by rail. Rail transportation rates to the principal Northwestern markets are lower than truck rates by 8 to 12 cents per hundredweight (Table 39). Some rate advantage of rail transportation to nearby markets is lost due to additional haulage charges at the terminal and shipping end of the haul. Truck competition in hauling potatoes is effective only in the Pacific Slope area. Data presented earlier in this report have

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1/ Church, Donald E. Effect of Increases in Freight Rates in Agricultural Products. p. 27-31.

Table 39

RAIL1/ AND TRUCK2/ TRANSPORTATION RATES FOR POTATOES
AS OF DECEMBER 1, 19533/
(Dollars per Hundred Pounds Minimum Weight4/)

Destination	Moses Lake	Ephrata	Pasco	Stockton	Klamath Falls	Twin Falls	Grand Forks	Presque Isle
	Origin							
Seattle								
Rail	0.30-36M	0.30-36M	0.29-44M	0.77-36M	0.59-36M	0.77-40M	1.39-36M	2.13-36M
Truck	0.34-30M	-	0.35-30M	-	1.46-20M	0.78-40M	-	-
Spokane								
Rail	0.21-36M	0.31-36M	0.28-36M	1.18-36M	0.67-40M	0.77-36M	1.39-36M	2.13-36M
Truck	0.27-30M	-	0.55-10M	-	-	0.71-40M	-	-
Portland								
Rail	0.30-36M	0.30-36M	0.29-44M	0.77-36M	0.36-44M	0.77-36M	1.39-36M	2.13-36M
Truck	0.37-30M	-	0.37-30M	-	0.41-30M5/	0.71-40M	-	-
San Francisco								
Rail	1.12-36M	0.97-36M	0.89-36M	-	0.36-36M	0.82-36M	-	2.13-36M
Truck	1.93-30M5/	-	-	-	0.41-36M	0.83-30M5/	-	-
Los Angeles								
Rail	1.09-36M	1.09-36M	1.02-36M	-	0.68-36M	0.95-36M	-	2.13-36M
Truck	2.54-30M5/	-	-	-	1.55-30M5/	0.81-30M5/	-	-
Chicago								
Rail	1.41-36M	1.41-36M	1.41-36M	1.46-36M	1.46-36M	1.27-36M	0.74-36M	1.27-36M
Truck	-	-	-	-	-	-	-	-
New York								
Rail	1.77-36M	1.77-36M	1.77-36M	1.82-36M	1.82-36M	1.68-36M	1.23-36M	0.76-36M
Truck	-	-	-	-	-	-	-	-
Boston								
Rail	1.77-36M	1.77-36M	1.77-36M	1.82-36M	1.82-36M	1.73-36M	1.25-36M	0.50-36M
Truck	-	-	-	-	-	-	-	-

1/ Tariff references: NPCFB Tariff No. 11-G; NPCFB Tariff No. 2-L; TCFB Tariff No. 2-S; TCFB Tariff No. 1-C; PSFB Tariff No. 1-S; PSFB Tariff No. 52-F

2/ Tariff references: PITB Tariff No. 9-B; PITB Tariff No. 8-B

3/ Prepared by Bishop and Bahler, San Francisco.

4/ Minimum weights are reduced from 36,000 pounds to 30,000 pounds during the new potato season: transcontinental, May 1 to September 30; Presque Isle, Maine, to local eastern points, June 1 to September 30; and Washington to California April 1 to September 30.

5/ Consolidated Freightways regular 4th class rate is 30,000 pounds minimum; except commodity rates, depending on backhaul, may be as low as $0.80 to San Francisco and $0.90 to Los Angeles, per West Coast Fast Freight, from Moses Lake.

shown that almost the entire volume of potatoes moving to the East is carried by the railroads.

3. Potato Warehousing

At the present time 70 to 80 percent of the crop is moved directly from the field to the market and does not require storage. Storage space for the balance appears to be adequate, but more will have to be provided as acreage increases. The railroads are giving some consideration to the desirability of providing storage facilities, but it is more likely that others will provide storage when and if needed. It is interesting to note that new storage facilities incorporate modern principles of warehouse construction, in contrast to the inefficient type "underground storage" available hitherto.

The premium obtained by Idaho potatoes has been achieved by emphasis on uniform size and quality and by improving the appearance of the potato. The Idaho shippers pioneered in washing and waxing potatoes. To maintain or improve their competitive position other specialized growing areas are compelled to follow similar practices.

Undoubtedly the Columbia Basin area will need to follow suit. These considerations will tend to favor large-scale warehousing facilities that can perform washing and waxing, and other storage functions, better and more efficiently than can small-scale facilities.

4. Some Problems in Marketing Potatoes

From the standpoint of marketing, the major problem of the Basin lies in its relatively unfavorable position in shipping to California and eastern markets. A specific problem appears to be an inequity in billing on a carload basis which results in a one-percent permissive weight differential in favor of Idaho. There is not much questioning on the part of the trade of the present over-all differential between central Washington and Idaho points, but there appears to be some concern in regard to the equity of a number of small differentials between individual shipping points and destinations.

A further problem viewed with some concern by the industry is the proposed 30-percent increase in rail refrigeration costs, which would mean an additional cost of $20 on a typical carload bill of $63. The standard refrigeration charge on a carload shipment from Moses Lake to Chicago is $88.21 per car, and the charge from Moses Lake to San Francisco is $66.15 (Table 40).

Table 40

TRANSPORTATION RATES FOR REFRIGERATOR AND HEATER PROTECTIVE SERVICE AS OF DECEMBER 1, 1953
(Dollars Per Rail Car)

Fresh Meat (Refrigeration)

Destination	Origin: Omaha	Denver
San Francisco and Spokane		
Summer		
Mimimum	110.00	95.00
Maximum	123.00	105.00
Winter		
1 Ice	40.00	38.00
2 Ice	87.00	80.00
3 Ice	--	84.00

Frozen Vegetables (Standard Refrigeration)

Destination	Origin: Walla Walla	Moses Lake	San Jose
San Francisco	99.20	98.21	--
Los Angeles	103.16	--	--
Chicago	--	133.91	132.92
Boston	--	--	168.62

Potatoes (Refrigeration)

Destination	Origin: Moses Lake	Twin Falls	Grand Forks
Portland			
Standard Refrigeration	--	--	85.96
1 Re-ice	--	--	--
San Francisco			
Standard Refrigeration	66.13	56.21	--
1 Re-ice	59.51	--	--
Chicago			
Standard Refrigeration	88.21	--	--
1 Re-ice	63.48	--	--

Potatoes (Heater)

Destination	Origin: Moses Lake	Twin Falls	Grand Forks
Portland	--	--	85.96
San Francisco	66.13	56.21	--
Seattle	88.21	--	--

Source: Prepared by Bishop and Bahler, San Francisco

Wheat and Wheat Flour

A. Importance of Wheat in the Columbia Basin

Cropland in the three counties of the Columbia Basin comprised 1,482,000 acres or a fifth of the cropland of the state of Washington in 1949. About 20,000 acres were irrigated. Winter and spring wheat was harvested from 663,000 of the 692,000 acres in crop in the Basin area. The wheat harvest accounted for a quarter of the wheat acreage harvested in the state. Compared to the land in wheat, the acreage grown in other grains (mostly oats and field corn) was negligible.

The importance of wheat production during the early stages of the development of the Basin is indicated by the 1952 census of the Bureau of Reclamation. Over a third of the irrigated cropland and irrigated pasture, 8,834 acres of the total of 24,000 acres, were planted to wheat. According to the 600,000-acre program of the Bureau of Reclamation, small grains, including wheat, are expected to utilize 15 percent, and corn, 4 percent of the cropland--a total of 107 thousand acres (See Section VI, page 81). Wheat will probably account for the bulk of the grains. Considering that wheat represented 80 percent of the grain acreage in 1952, it may be expected to occupy 65,000 to 70,000 acres after development of the 1960 program. However, the Basin irrigation program is not expected to result in more than a modest expansion in wheat production in Washington.

B. Wheat Acreage Adjustment

The accumulation of large domestic wheat inventories due to the contraction of the export market resulted in the introduction of a quota and acreage allotment program. Under this program, production of wheat in the Northwest is being decreased by 30 percent. Planting of barley and other feed crops on the released acreage is expected to aggravate the general feed supply situation. For economic reasons, farmers in the northwestern wheat area do not like the alternative of summer fallow and prefer to plant winter wheat.

The possible importance of grain and silage corn in the livestock feeding program in the Columbia Basin has been discussed in an earlier section. Opportunities for using corn as a feed substitute for wheat appear to have been enhanced by the support price program. Estimates of feed consumption of corn and wheat in Oregon and Washington by the Agricultural Marketing Service indicates a decline of about 100 thousand tons in wheat consumption for feed between the 1947 and 1952 crop years. The decline in wheat consumption was compensated by an equivalent increase in corn consumption (Table 41). The evidence indicates that this additional volume of corn was largely obtained by inshipments to the Northwest. A return of normal wheat-corn price relationships may be expected to improve the position of wheat for feeding purposes.

Table 41

CONSUMPTION OF WHEAT AND CORN IN WASHINGTON AND OREGON
CROP YEARS 1947-48 TO 1952-53
(Tons)

	Wheat			Corn			
Crop Year	Consumed by Producer	Bought in Feed Trade	Total Consumption	Consumed by Producer	Bought in Feed Trade	Total Consumption	Total Consumption Corn and Wheat
1947-48	154,740	197,550	352,290	20,244	111,374	131,618	483,908
1948-49	157,770	162,600	320,370	16,940	170,560	187,500	507,870
1949-50	143,100	138,750	281,850	20,636	233,621	254,257	536,107
1950-51	127,110	125,250	252,360	18,732	195,659	214,391	466,751
1951-52	130,590	112,500	243,090	20,776	193,629	214,405	457,495
1952-53	142,110	117,870	259,980	21,448	219,928	241,376	501,356

Source: Information from M. Fluke, U. S. Department of Agriculture, Agricultrual Marketing Service, Portland, Oregon, December 22, 1953.

Substitution of wheat for feed is difficult because of the serious price disadvantage in relation to other feeds. In early December 1953, Portland prices were $68.20 per ton for corn, $79 per ton for wheat, and $57.50 per ton for barley. For wheat to compete with grain corn shipped in from the Corn Belt, the price of wheat would have to be about 30 cents per bushel less than present prices. In an irrigated area such as the Columbia Basin, it may be expected that livestock feeders will find it advantageous to expand the production of corn proportionately to wheat.

C. Terminal Facilities

Portland is the largest wheat-handling port on the Pacific Coast and, together with Vancouver, handled nearly half the wheat moved out by water from Pacific Northwest ports in 1952-53. Portland is also an extensive flour milling center. Wheat barged down the Columbia is exported for the most part, because barges cannot be unloaded directly into mill elevators with present facilities. In Portland and Vancouver it is usually emptied from barges by suction. The Portland Commission of Public Docks together with private interests is planning to expand the present 2.5-million-bushel terminal facilities to an ultimate storage of 5.3 million bushels and to provide barge unloading facilities in Vancouver.

Wheat arrives at elevators at barge loading points by truck, usually directly from the farmer, perhaps out of his elevator, or from an inland elevator without rail facilities. At the present time, trucks are hauling wheat about 100 miles from barge loading points. As a result, contingent on a favorable rate situation, the entire Columbia Basin could become a potential wheat supply area for the Portland market.

D. Pattern of Movement

1. Barge Transportation Down the Columbia River

At present, the principal barge cargoes are petroleum products, cement, and wheat. Cement is barged upriver for the construction of the McNary Dam from a plant in Portland. A large volume of petroleum products moves upriver for the use of farmers and others in the interior. Wheat is the major commodity moving down the river. Some gasoline is also barged down-river from the Pasco terminus of a Salt Lake City products line, and some livestock is moved to the Portland stockyards by barge.

After the completion of The Dalles Dam, larger barges, two- or three-thousand ton, will be enabled to go upriver. It is expected within a few years that several large barges at a time may be towed up to Pasco and beyond on the Snake River. Development of the Columbia River for slack water navigation and use of larger barges will eventually permit shipments in

the coast trade without transshipment at the lower Columbia River ports. This should be important for shipping wheat out and for shipping in bulky commodities required by agriculture, such as anhydrous ammonia, nitrogenous fertilizer, as well as petroleum products. Barge service is planned to extend as far as Lewiston, Idaho, into the heart of the famous Palouse wheat and dried pea-producing region. At present the Palouse has access to Seattle by rail, and to Portland by rail and by a combination of truck and barge movement.

2. Barge and Truck Relationships

As has been mentioned, a combination of barge and truck movement is used to transport wheat from certain areas. Trucks expand the area of supply served by barge lines and extend the area of competition with rail movement. For short distances up the river from the terminals, truck transportation is in direct competition with barge lines. At present there are many instances of grain hauls of 250 miles by truck from eastern Oregon to the Portland terminals; whereas three years ago there was hardly any truck movement to the terminals.

It is estimated that in 1952 the equivalent of 225 thousand tons was hauled by trucks compared to a barge movement of 275 thousand tons to the port terminals at the mouth of the Columbia River. This development has occurred for the following reasons: (1) increasing costs of rail transportation; (2) steady improvement and growth of the trucking industry; (3) backhaul of a broad range of manufactured goods to grain growing communities from terminal ports or markets which are usually major distribution centers; (4) availability of wheat for shipment on a year-round basis; (5) availability of farm loading or unloading at country elevators without rail facilities; (6) low costs of loading and unloading; (7) feasibility of loading small-sized lots at the farm; (8) exemption of unprocessed agricultural commodities from truck rate regulation.

At the present time, about 10 percent of the wheat arriving at the port of Vancouver comes by barge and the remainder by rail. During the peak of harvesting, shortage of rail cars may route wheat to the coast by barge from elevators located along rail lines. Except seasonally when some diversion of wheat to barge from rail may occur, it is more economical to ship from elevators by rail.

To extend the radius of competition, barge companies frequently operate trucks of their own, arrange for trucking by others on a "participating" or over-all rate basis. The combination of truck and barge movement has extended the radius of competition substantially from Columbia Basin points. Rates on the combined truck and barge hauls are frequently quoted on an over-all basis. The following are sample charges per hundredweight for hauls of about 50 miles from Pendleton to Umatilla:

Load minimum, 39,000 lbs.
Trucking charge, 23.8 cents/cwt.

For the off-season shipment of grain by barge to Portland via Umatilla, the following charges prevail:

Loading: 3.0 cents per cwt.
Unloading Barge: 1.0 cents per cwt.
Barge Rate: 31.25 cents per cwt.

As a general rule, barge and truck transportation operate together in moving wheat directly from the farm without going through the country elevator. Grain movement through a commercial elevator situated on a railroad for coastal or interior movement subjects the shipper to handling and storage charges, in addition to the rail rate. Typical elevator charges in central Washington and Oregon are:

Handling in and out, including 10 days' storage: 4 cents/bushel
Storage per month: 1 cent/bushel

Country elevator handling charges are absent in the combination of barge and truck movement. However, in contrast to rail transportation, barge movement involves additional costs of loading and unloading. Ordinarily barge companies absorb these costs to the extent that they exceed elevator handling costs incurred in connection with rail shipments.

As is pointed out by interests in the Pacific Northwest, it is possible to show that rail rates have been effectively held down by the existence of competition from barges in the haul from representative interior points to Portland, and other lower Columbia River ports, where the haul is entirely or in part by barge. Rates today are about the same as or less than in 1930. In contrast, rates for other points in the same region not affected by river navigation have increased generally by at least 50 percent over the same period of time.1/ Many of the points for which rates by rail and by barge are interrelated are on branch lines extending back from the rail lines along the river. For points without rail facilities, the combination barge and truck rate is the sum of the rail rate plus the trucking charge to the nearest shipping point. When these points get sufficiently close to Portland, a more direct truck haul is competitively possible.

1/ Portland Freight Traffic Association. Memorandum on Freight Rate Savings due to Commercial Navigation on the Columbia River. p. 6 and Appendix No. 6.

There is a prevailing opinion that railroads have been trying to eliminate competition of other carriers by reducing rates to a point at which barge or truck operation becomes unprofitable. It is argued, however, that the railroads would hesitate to attack the hauling of wheat in this way in view of the many interested shippers; but that this approach may by quite feasible for a commodity such as petroleum, where only specialized haulers are directly affected. Currently an attempt is being made to reduce rates for petroleum by 30 percent. This is much feared by producers because it is felt that rail rates will bounce back again once competing carriers have been eliminated.

3. Truck and Rail Competition

The grain trucking is usually confined to moderately short distances. The grain trade is conservative in using a new transport medium, and established relationships are important and not easily changed. Shippers are wary of too great a dependence on a single means of transport which might easily be interrupted by lack of sufficient units of equipment. The efforts of trucking companies to capture the grain business are focused on the backhaul. The addition of every new commodity hauled into a grain growing area by truck intensifies competition for the grain business on the outbound movement.

Trucks are at a disadvantage when in-transit and/or diversion privileges are important. Trucking companies offer transit privileges in certain situations, but the limited area served makes this privilege less attractive. The in-transit privilege tends to hold business to the railroads, particularly when coupled with the diversion privilege. Two diversions are permitted free of charge. Diversion privileges, as a rule, cannot be offered by trucks due to the practical difficulty of maintaining touch with a carload en route. Another competitive feature of rail transportation is the mixed carload, which is particularly common on shipments out of flour mills.

Trucks are handicapped in hauling to grain terminals because they require larger handling space. Nevertheless, trucks are used in the moving of feed to farmers in the restricted area around a feed mill. Much of this service is performed by proprietory trucks in view of the difficulty of getting contract haulers to use the specialized trucks required, and because of the close relationship that needs to be maintained with the customer.

In the long distance bulk movements of grain, trucks have been increasingly competitive with rail shipments. In witness of this are bulk shipments by truck from Utah and Idaho to the Los Angeles area and the movement of sorghum grains from the Texas Panhandle into California. However, for the longer haul

to California from the Northwest or from distant points in the western states, the transit and diversion privileges offered by the railroads is a favorable competitive factor.

There is some feeling that the direct truck movement of wheat to the terminals is "demoralizing" the wheat market because it upsets the prevailing rate structure, which in turn creates some uncertainty in pricing for the purchasing agent at the country elevator.

4. Barge and Rail Competition

Speed is no problem in barge service between Columbia Basin points and lower Columbia River ports since overnight barge service is the general rule. Service by both barge and rail is adequate and reliable. In general, rail service is more feasible. The advantages of rail over barge movement are: (1) diversion privileges, (2) milling in transit, (3) carload as a convenient unit of sale, (4) larger number and greater accessibility of loading points, (5) lower costs of loading equipment and labor.

Diversion privileges are not particularly important in the Pacific Northwest as most of the wheat is known to be destined for export when it leaves the country elevator. Similarly milling in transit is not an important factor because there is no need for this privilege on export wheat. Export flour is produced in general by mills in a position to load directly on cargo ships. The unit of purchase makes little difference to the exporter because of the large volume of wheat involved.

The accessibility of loading points is an important factor in the competition of barge and rail movement in the Pacific Northwest. The small number of upriver loading points and the limited access to wheat-producing areas near these points tends to limit the use of barges.

The expense of unloading equipment and labor, as well as the uncertainty in waterfront labor relations, has a tendency to limit the use of barges. In spite of these disadvantages barge hauling of wheat is expected to continue to grow. Increasing rail operating costs and the resulting pressure for higher rates will become an important factor.

E. Future of the Northwest Grain Trade

During the five-year period, 1947-51, a balance was achieved in the northwest wheat situation with no increase in carry-over stocks largely due to the extensive domestic offshore shipments financed by the United States government. The situation is described by a hypothetical production and disposition relationship (Table 42).

Annually the total supply amounted to 124 million bushels consisting of production of 105 million bushels and inshipments of 19 million bushels mostly from Montana. Of the total supply, 80 million bushels, consisting principally of grain and some flour, moved into export channels. The remaining 44 million bushels moved into domestic markets, composed of 24 million bushels needed for local usage, and 20 million bushels, mostly flour shipped into the domestic market.

These hypothetical figures are based on the assumption that all grain is shipped from the Northwest and not milled there. The figures portray the extent to which the northwestern wheat economy has become dependent upon the export market. It also indicates how this balanced situation drastically altered in the 1952-53 crop year due to increased domestic production and the decline in the export market for United States wheat. A decline in wheat and wheat flour exports immediately shows up in an increased carry-over in the Pacific Northwest in the absence of larger movements in the domestic market. The situation has portents of important repercussions on the Northwest wheat economy.

Table 42

SUPPLY AND USE OF WHEAT AND WHEAT FLOUR
IN THE PACIFIC NORTHWEST

FIVE-YEAR AVERAGE, 1947-51
(Millions of Bushels)

Supply and Use	Northwest Wheat	Inshipments of Wheat	Total Wheat
Production	105	-	105
Inshipments	-	19	124
Local Use			
Seed	6	0	6
Feed	10	0	10
Flour	4	4	8
	20	4	24
Domestic Outshipments (Rail)			
Grain	3	0	3
Flour	10	7	17
	13	7	20
Exports			
Grain	65	4	69
Flour	6	5	11
	71	9	80
Total Disposition	104	20	124

Source: Information from E. J. Bell, Administrator, Oregon Wheat Commission, Pendleton, Oregon, December 14, 1953.

In view of over-production of wheat in relation to domestic and export demand, and the probability of a lower national support price, it would seem that, in the long run, the only satisfactory alternative to the northwestern wheat problem will be a reduction in the price of wheat to permit it to compete in the eastern domestic market.

In the postwar period the price of northwestern wheat has been high in relation to the domestic wheat price because of the strong overseas market. Assuming relatively free prices or lower support prices in the domestic market and a decline in the amount of grain and flour taken by world markets, wheat prices in the Northwest can be expected to drop to improve the competitive position of northwest wheat in domestic markets and to restore the old pattern of movement to the east.

Freight rates on wheat have gone up substantially in the transcontinental movement of wheat to eastern markets. Obviously any downward adjustments in the eastbound freight rate will directly improve the price position of the grower in the Columbia Basin and the Northwest. Considerable efforts are being made by organized groups in the area for a downward adjustment of the eastbound freight rate.

It is also argued by northwestern interests that government support programs have been responsible for the loss of the southern and eastern markets on the grounds the northwestern farmer has been induced to store his wheat while waiting for a favorable market price. It is pointed out also that the loan rate of the United States Department of Agriculture has placed the southern Idaho wheat growing area in a more favorable competitive position in the California market. This is enough to overcome the 3-cent per hundredweight advantage of Pendleton over Pocatello in rail freight to San Francisco (Table 43).1/ However, for most California points trucks appear to be handling the movement from southern Idaho points from which the mileage advantage is substantial.

The principal channel of northwestern wheat movement to California is via milling points, such as Spokane, Walla Walla, Portland, and Seattle, movement in which the transit privilege is important. An over-supply of wheat in the Northwest resulting in a lower relative regional price might be expected to increase shipments to the California markets, since northwestern shipments would be based on a lower price level than those originating in Montana.

1/ By rail, Pocatello has a 21-cent advantage in the Los Angeles market.

Table 43

RAIL1/ AND TRUCK2/ TRANSPORTATION RATES FOR WHEAT AND WHEAT FLOUR
AS OF DECEMBER 1, 19533/
(Dollars per Hundred Pounds, Minimum Weight)

Destination	Origin: Moses Lake	Ephrata	Pasco	Spokane	Pendleton	Oregon, Washington, Northern Idaho	Pocatello	Missoula	Billings
Seattle									
Rail	0.414/	0.414/	0.324/	0.464/	0.344/	-	0.774/	-	-
Truck	0.52-30M*	0.52-30M*	-	-	0.36-20M*	-	-	-	-
Spokane									
Rail	0.354/	0.354/	0.324/	-	0.354/	-	0.774/	-	-
Truck	0.68-20M*	0.69-20M*	-	-	0.97-30M*	-	-	-	-
Portland									
Rail	0.484/	0.464/	0.324/	0.464/	0.324/***	-	0.774/	-	-
Truck	0.52-30M*	0.60-20M	-	-	0.36-20M*	-	-	-	-
Los Angeles									
Rail	1.134/	1.134/	1.074/	1.144/	1.074/	-	0.864/	-	-
Truck	-	-	1.41-20M*	1.41-20M	1.41-20M*	-	-	-	-
San Francisco									
Rail	0.844/	0.844/	0.794/	0.864/	0.764/**	-	0.794/**	-	-
Truck	-	-	-	1.17-20M*	1.17-20M*	-	1.05-10M	-	-
Minneapolis									
Rail	1.044/	1.044/	1.044/	1.044/	1.044/	0.974/	1.044/	0.844/	0.744/
Truck	-	-	-	-	-	-	-	-	-

1/ Tariff references:
NPCFB Tariff No. 10-M
TCFB Tariff No. 45-G
SFTB Tariff No. 94-U
PSFB Tariff No. 241-C
WLT Tariff No. 332-E
UP Tariff No. 6035-I
UPRR Tariff No. 6090-C

2/ Tariff references:
PITB Tariff No. 8-B
PITB Tariff No. 9-B
RMTB Tariff No. 30

3/ Prepared by Bishop and Bahler, San Francisco, except where noted.
4/ Wheat flour, minimum weight 60,000 pounds.
* Wheat flour only.
** Appendix D, Sheet 1, PNN & GPA.
*** Appendix No. 2, Portland Freight Traffic Association

Frozen Fruits and Vegetables

Growth in frozen fruit and vegetable production in the West has been very rapid over the past few decades. The dynamic nature of this growth is illustrated in Table 44. The frozen fruit pack in the West has risen from 84 million pounds in 1940 to 192 million pounds in 1951. The frozen vegetable pack has risen even more spectacularly: from 35 million pounds in 1940 to over 445 million pounds in 1951.

A. Movement Pattern

As indicated earlier, reliable quantitative data on the volume and pattern of traffic flow of frozen fruits and vegetables are unavailable. However, there are data which indicate the nature of the movement.

The volume of movement recorded in the Waybill Sample data is quite small and is therefore subject to a large sampling error. However, the data indicated in Appendix Table A-20 illustrate the widespread movement of frozen vegetables into many states outside the Pacific Slope. Although the volume of this movement cannot be measured with any degree of accuracy from these data, their significance lies in the fact that frozen vegetables move to markets at great distance from processing and growing areas. Therefore, the level of transcontinental rail rates is an important factor in the market orientation for frozen vegetables. The same general pattern of widespread distribution also exists for frozen fruits. For a wide range of commodities, much of the frozen fruit and vegetable industry is concentrated in the Pacific States, and shipments are made to all parts of the United States and Canada.

There is also a substantial north and south movement of frozen foods on the West Coast, representing an interchange of commodities grown most advantageously in the several trading areas. For example, peaches are shipped north from California, while corn and peas are shipped south from Washington and Oregon. However, it is impossible to determine from available data the magnitude of this movement or the proportions moving by rail or by truck. Much research needs to be done in developing data on movement patterns along the Pacific Coast, particularly since a great amount of the movement is by truck.

1. Carriers Utilized

Movement of frozen goods into initial storage is principally by truck. This follows the usual pattern of utilizing trucks for short hauls. For the intermediate haul from the producing area to the distribution warehouse, the choice of carrier depends upon comparative cost, availability of adequate refrigeration equipment, and satisfactory scheduling. For the most part, railroads are used on shipments from the Coast to eastern points beyond Denver. There is some backhaul from the

East in refrigerator cars hauling frozen juices, fish, cranberries, frozen apples, and other commodities. However, this movement is minor in volume, and most cars are returned empty or with other approved merchandise. A typical distribution of cars returning through the El Paso "outer gateway" is about 10-percent loaded. A 34-day turn-around is common from the western loading point back to a similar point on the next cycle.

Table 44

FROZEN VEGETABLE PACK AND FROZEN FRUIT PACK
OF THE ELEVEN WESTERN STATES, 1940-1951
(Millions of Pounds)

Year	Frozen Vegetable Pack	Frozen Fruit Pack
1940	35	84
1941	53	105
1942	70	101
1943	123	159
1944	126	208
1945	163	317
1946	270	272
1947	213	170
1948	239	186
1949	328	184
1950	327	203
1951	445	192

Sources: Stanford Research Institute, Western Resources Handbook, Section IV-N.
Compiled from the records of the National Association of Frozen Food Packers, Western Frozen Food Processors Association, Northwest Frozen Foods Association, Northwest Fruit Barrelers Association, Michigan State College, Association of New York State Canners, Utah Canners Association, and from reports of individual packers to Western Canner and Packer.

Truck movement of frozen foods to the Middlewest has been relatively small. It depends largely on the availability of backhaul commodities, such as dressed meats. Frozen foods are trucked regularly from the Northwest to Minneapolis, and livestock products are hauled west.

Most of the north and south movement along the Pacific Coast is by truck. Recent rail rate changes may have such influence in increasing shipments by rail.

2. Warehousing and Distribution

For the distribution of frozen foods, cold storage warehouses play an important part. The extremely seasonal character of the pack of frozen food commodities requires that cold storage be provided until the next packing season. To provide for requirements in the western states as the season advances, it is advantageous to store the bulk of the supply in western warehouses and to ship east as orders come in.

There are three major types of cold storage warehouses: (1) area-producer establishments that receive processed and packaged foods, usually for initial freezing, directly from the processor; (2) distribution cold storage warehouses that receive shipments from producer warehouses and make distribution directly to the trade or to the ultimate consumer; and (3) cold storage plants that share some of the characteristics of each of these types. In addition there are warehouses, especially in Oregon, Washington, and the Middlewest, which are used for transit storage of goods on transcontinental movement to distribution warehouses in the East.

State property taxation of warehouse inventories in a number of states is an important factor affecting the movement, and thereby the economy, of transporting frozen foods. There is usually a large outflow of merchandise from the state of California at tax assessment time in the spring. While the state of Oregon has a similar law, it permits a refund of the tax if goods later move out within a certain time after the assessment date. These laws result in a large concerted movement of merchandise at tax time which sometimes burdens transportation facilities to the extent that some warehouses cannot clear themselves.

3. In-Transit Features

Storage in-transit privileges are of considerable importance in the rail transportation of frozen foods. They are used by both California and northwest shippers on rail shipments of frozen foods. For example, Klamath Falls, Oregon, is a convenient storage point for California and Oregon shippers. Various points, such as Mt. Vernon, Yakima, and Walla Walla in Washington, and Nampa, Idaho, are also in-transit storage points, depending on the location of the packer, market considerations, and other factors. In some instances, plants in the Northwest avoid high charges in local warehouses by shipping toward the East for storage in transit. For example, shipment may be on the Union Pacific Railroad with storage at points like Nampa or Denver, where shipments may be combined into mixed carloads, often using the "stop-off for loading" privilege.

There have been requests for in-transit privileges for processing operations, such as repackaging in connection with the combining of vegetables for various vegetable mixes, such as succotash. As yet, this type of in-transit operation has not been allowed. Apparently the matter is complicated by difficulties in apportioning revenue among the rail lines, particularly the eastern roads.

4. Other Transportation Features

In addition to in-transit privileges, there are other practices in shipment which are utilized in the transportation of frozen fruits and vegetables. One of these is the "stop-over" privilege which permits extra stops for the completion of loading or unloading. This feature is more commonly used in connection with rail shipments, although trucks sometimes offer this privilege in certain runs. Until recently, the stop-over privilege has usually permitted an extra stop at each end. On some movements, this has been broadened to two extra stops for completion of loading and unloading. Multiple stops, however, create a problem because of the danger of product deterioration if the temperature is not carefully controlled at the stops, especially with bunker-type cars.

Diversion privileges are of little importance in the shipment of frozen foods. Because the price structure for frozen foods is fairly stable, merchandise is usually shipped to a definite consignee.

5. Shipping Containers and Cases

An important problem in the transportation and marketing of frozen fruits and vegetables is the extreme diversity in the size, weight, and shape of containers and shipping cases. The greatest diversity in the type of containers and cases used exists in the household trade, where it creates the greatest problem. The problem is not acute in the institutional market because containers used in institutional business are larger and there is a narrower range in the type of containers utilized.

For economy in handling, there is an advantage in larger sized units. On the other hand, retail stores prefer to receive cases containing a dozen containers, or even as little as half a dozen containers. For this reason, the frozen food packer has commonly aggregated as many as four cases of one dozen containers by using glue or binding, thus enabling these units to be broken apart as desired. Methods of packing and aggregating units have been uneconomical. Units tend to break apart in handling. While reduction in the number of consumer container sizes has been achieved, the need for a greater standardization of shipping cases and better methods of aggregation of cases remains acute.

Aggregation of cases into larger units has been one means of achieving economy and ease of handling in cold storage warehouses. However, the density of frozen foods is now of serious concern to cold storage warehouses. In the early days of the frozen food industry, the principal commodities were relatively heavy, such as fruits. With the processing of more and more vegetables, the density of frozen foods handled has been growing lower. For this reason, the matter of cubic size is becoming more serious for the warehouses. Most warehouses have based their charges upon weight, but with the increasing volume of lighter density commodities, particularly vegetables, there appears to be a growing practice in the industry to charge penalties for lighter units, particularly those weighing less than 20 pounds. At the present time, cold storage warehouses are discussing the possibilities of basing tariff charges upon the density of the commodity rather than weight.

6. Minimum Carload Weights

In some cases, minimum carload weight requirements have been too high to be reached even with full stowage of the cars with some low density products. Action has been taken in many cases to reduce minimum weights for cars of 2,200 cubic total capacity or less from 46,000 pounds to 40,000 pounds, and to establish 46,000 pounds as the minimum weight for cars of over 2,200 cubic feet capacity.

The movement of frozen foods by rail has been hampered by high minimum carload weights, which have been out of reach for some of the light density commodities, such as broccoli and cauliflower. It is believed that even the reduced minimum requirements may be too high for some of the low density commodities.

7. Refrigerated Transportation Facilities

The major problem in transportation of frozen foods is the adequacy and the availability of properly refrigerated railroad cars, trucks, warehouses, and handling facilities. This need is indicated by the great increases in production of frozen foods, described earlier.

In providing refrigerated transportation service, the railroads have until recently been limited to the standard type of refrigerator car with an interior length of 33 feet and a capacity of approximately 2,000 cubic feet. More recently "super" refrigerator cars of the bunker type, 38 to 50 feet interior length with a capacity of 2,550 to 2,950 cubic feet, have become available. However, the number of mechanically refrigerated cars available has remained very small. It

was estimated that there would be about 325 1/ cars by the end of 1953. Mechanical refrigeration in rail cars has not progressed very rapidly.

As a matter of fact there is some feeling that even more standard refrigerator cars are needed. In 1953, a total of 2,912 new refrigerator cars were built, with 39,000 new cars built over the past 10 years. At this rate, it would take 10 years to replace the 40,000 refrigerator cars which have been in service for more than 25 years. 2/

One factor which needs investigation in this connection is the effect of the level of mileage rates on the construction of new refrigerator cars. It has been asserted that the level of mileage rates has discouraged private carlines from building new equipment, particularly since construction costs have risen greatly. During the course of the study, shippers expressed general satisfaction with the new mechanical refrigerator cars. However, they feel that there are not enough of them.

Some dissatisfaction with railroad service was expressed by shippers who feel that they frequently receive second grade refrigerator cars. In addition, they sometimes find it difficult to get cars when needed.

Today fleets of trucks, properly insulated and mechanically refrigerated, are available for hauling frozen foods. But the consensus appears to be that mechanical refrigeration on trucks has not been entirely satisfactory. The principal problem is the breakdown hazard and faulty operation of the mechanical systems which affect the maintenance of proper temperatures. The remedy would seem to lie in better servicing and in prompt recognition of trouble by the driver. Owing to these hazards, truck refrigeration necessarily relies heavily on dry ice. This type of refrigeration has been found satisfactory on the two-day truck haul from the Northwest to California points.

B. Frozen Fruits and Vegetables in the Columbia Basin

In recent years the principal frozen foods packed in the Pacific Northwest have been peas, strawberries, sweet corn, and green beans.

1/ Refrigeration Engineering, January 1953.
2/ From an address by C. W. Taylor, Director of Bureau of Service, Interstate Commerce Commission, before the United Fresh Fruit and Vegetable Association, February 1-4, Chicago.

in that order. In 1952 these commodities represented about two-thirds of the pack in both Oregon and Washington. The large growth in the industry is taking place in the vegetable pack in these states. The Washington frozen food industry is concentrated primarily in the Mt. Vernon, Yakima, and Walla Walla areas. The Mt. Vernon area has the largest and most diversified development of the industry. The Walla Walla area is a heavy processor of peas, and the Yakima area emphasizes production of sweet corn.

In view of the present and potential importance of the freezing of sweet corn in the Columbia Basin, this discussion will emphasize this commodity. Expansion of the sweet corn pack in the West has been very rapid over the last three years, as it has for the United States as a whole (Table 45). The 1953 pack of cut corn and corn-on-the-cob was estimated to reach 43 million pounds compared to a production of 28 million pounds in 1952 and 18 million in 1951.

Table 45

FROZEN CUT CORN AND CORN-ON-COB PACKS
IN THE UNITED STATES AND THE WEST 1/ 1942-1952
(Thousands of Pounds)

	Cut Corn		Corn-on-Cob		Total	
Year	U. S.	West	U. S.	West	U. S.	West
1942	9,369	n.a.	1,767	n.a.	11,136	n.a.
1943	21,449	n.a.	846	n.a.	22,295	n.a.
1944	20,983	n.a.	606	n.a.	21,589	n.a.
1945	25,551	n.a.	445	n.a.	25,996	n.a.
1946	42,427	n.a.	2,296	n.a.	44,723	n.a.
1947	26,559	n.a.	6,064	n.a.	32,623	n.a.
1948	20,920	n.a.	10,324	n.a.	31,244	n.a.
1949	37,076	n.a.	17,563	n.a.	54,639	n.a.
1950	32,998	13,866	10,069	4,082	43,067	17,948
1951	44,549	24,593	8,772	3,605	53,321	28,198
1952	62,684	34,834	14,196	8,153	76,880	42,987

1/ Includes California, Colorado, Idaho, Montana, Oregon, Utah, Washington, and Wyoming.

Source: National Association of Frozen Packers, Frozen Food Pack Statistics: 1952, Part 2--Vegetables.

According to the Census of the Bureau of Reclamation, sweet corn output in 1952 was 1.6 million pounds (Section VI, Table 25). Sweet corn is produced principally in the Quincy and Moses Lake areas. Asparagus, peas, carrots, and squash are other important vegetables grown for freezing in the Columbia Basin. It is estimated that

sweet corn marketed will reach 40 million pounds at maturity of the 600,000-acre program (Table 25 and Figure 7).

At the present time production of freezing crops has not yet reached a volume large enough to warrant establishment of a plant in the Columbia Basin. A plant at Wenatchee, 30-odd miles west of Quincy, has stimulated development of the industry in the Basin by letting contracts with growers. The plant is operated the year round by obtaining raw supplies locally, and from the Puget Sound and Basin areas. Husked corn is shipped in by truck from Quincy and Moses Lake. The Basin is already a very important source of vegetables for freezing in this plant. As volume grows, it may be economically feasible to shift some of the processing functions to the Basin.

The difficulty in freezing cut corn is the relatively low recovery and a high amount of physical waste. Corn husks and cobs are salvaged and form an important basis for a growing cattle industry supported in part on these agricultural by-products. Eventually the husking and dekernelling function could be performed in the Basin near the producing area to reduce the costs of haulage. Increased sweet corn production could be expected to result in the establishment of new plant facilities if the expected rate of development continues. Facilities will undoubtedly be developed in the Moses Lake and Quincy areas in the near future. Similar development in the Pasco-Kennewick area may be based first upon the nearby Yakima-Roza project. This may stimulate production of freezing crops in the southern portion of the Basin similar to the stimulation provided by the Wenatchee industry.

1. Rate Structure--Frozen Corn

In order to evaluate the competitive position of the Columbia Basin in relation to adjacent producing and processing areas, a brief analysis was made of the rate structure on shipments of frozen corn from the Pacific Northwest.

Transcontinental Rates. On transcontinental rail movements to eastern destinations, rates are equalized from all points in the Pacific Coast states (Table 46). Thus, the Columbia Basin area has no rate disadvantage in transcontinental shipments with other areas on the Coast producing frozen fruit and vegetables. As mentioned earlier, however, growers and processors of frozen vegetables are concerned with the level of transcontinental rail rates because of possible limitations on markets available to them.

Truck rates on long haul shipments are of less importance since most frozen fruit and vegetables move east of Denver by rail car. However, on truck shipments to Chicago and other midwestern points rates are equal from a relatively wide range of points in Washington, Oregon, and Idaho. For example, frozen

vegetables can be shipped from Walla Walla, Wenatchee, and Yakima, Washington, Pendleton, Oregon, and Lewiston, Idaho, for the same rate, $2.65 per hundredweight. However, truck rates now listed from Pasco, Ephrata, and Moses Lake to Chicago are $3.28 per hundredweight. The higher level of these rates is due to lack of volume movements from these points. In the event that shipments in volume are developed from these Columbia Basin points, the rates can probably be adjusted downward because of competitive forces among carriers and growing areas.

North-South Rates. On rail movements from the Pacific Northwest to California points, rates are equal from Pasco, Yakima, and Walla Walla, Washington, the principal shipping points. No competitive commodity rates are currently in effect from Columbia Basin points, other than Pasco. However, it is probable that should processing plants be established in the Basin, competitive rail rates would be established from Columbia Basin points on North-South movements.

On movements to California points, truck rates are somewhat higher than rail rates. However, truck and rail services are competitive even when the truck charge is a little higher. The higher truck rate is justified because trucks offer lower minimum weights, faster service, cheaper loading and unloading, no additional charge for refrigeration, and savings in stopovers.

There is much greater variance in truck rates to California points, as can be seen from Table 46 and Appendix Table A-21 There are also some differences among carriers. Generally speaking, however, points in the Columbia Basin are in a competitive rate relationship with adjacent producing areas on movements to various California points.

Short Haul Rates. On rail shipments from Ephrata, Pasco, and Yakima, rates are identical to Seattle, Spokane, and Portland. These three cities will be important nearby markets for Columbia Basin frozen corn. Truck rates vary according to distance and competitive conditions, but, in general, truck rates from Columbia Basin points are no less favorable than from adjacent growing areas.

Table 46

RAIL1/ AND TRUCK2/ TRANSPORTATION RATES FOR FROZEN SWEET CORN
AS OF DECEMBER 1, 1953
(Dollars per Hundred Pounds, Minimum Weight)

Destination	Moses Lake	Ephrata	Pasco	Yakima	Walla Walla	Portland	Seattle	Modesto	San Jose	Fort La Vaca (Texas)
	Origin									
Seattle										
Rail	-	0.82-40M	0.82-40M	0.82-40M	-	-	-	1.11-40M	1.11-40M	-
Truck	-	-	0.77-20M	0.77-20M	0.95-20M	0.59-36M	-	-	-	-
Spokane										
Rail	-	0.82-40M	0.82-40M	0.82-40M	-	-	-	-	-	-
Truck	-	-	-	1.08-10M	-	0.95-20M	0.95-20M	-	-	-
Portland										
Rail	-	0.82-40M	0.82-40M	0.82-40M	-	-	-	0.90-40M	0.90-40M	-
Truck	-	-	-	0.77-20M	-	-	0.59-36M	-	-	-
San Francisco										
Rail	-	-	1.08-40M	1.08-40M	1.08-40M	-	-	-	-	1.92-40M
Truck	-	-	1.28-40M	1.17-40M	1.29-40M	0.95-40M	1.17-40M	0.38-28M	0.25-40M	-
Los Angeles										
Rail	-	-	1.30-40M	1.30-40M	1.30-40M	-	-	-	-	-
Truck	-	-	1.55-35M	1.32-40M	1.84-30M	1.28-35M	1.33-30M	-	-	-
Minneapolis										
Rail	1.79-46M	1.79-46M	1.79-46M	1.79-46M	1.79-46M	-	-	1.79-46M	1.79-46M	-
Truck	2.76-28M	2.76-28M	2.76-28M	2.42-28M	2.42-28M	2.42-28M	2.42-28M	-	3.28-30M	-
Chicago										
Rail	1.87-46M	1.87-46M	1.87-46M	1.87-46M	1.87-46M	-	-	1.87-46M	1.87-46M	1.93-46M
Truck	3.28-28M	3.28-28M	3.28-28M	2.65-28M	2.65-28M	2.65-28M	2.65-28M	2.95-30M	2.95-30M	-
New York										
Rail	1.87-46M	1.87-46M	1.87-46M	1.87-46M	1.87-46M	-	-	1.87-46M	1.87-46M	2.01-36M
Truck	-	-	-	-	-	-	-	-	-	-
Boston										
Rail	1.87-46M	1.87-46M	1.87-46M	1.87-46M	1.87-46M	-	-	1.87-46M	1.87-46M	-
Truck	-	-	-	-	-	-	-	-	-	-
Houston										
Rail	1.79-46M	1.79-46M	1.79-46M	1.79-46M	1.79-46M	-	-	1.79-46M	1.79-46M	-
Truck	-	-	-	-	-	-	-	-	-	-

1/ Tariff references: TCFB Tariff No. 2-5
TCFB Tariff No. 44-L
NPCFB Tariff No. 2-L
PSFB Tariff No. 1-S

2/ Tariff references: PITB Tariff No. 9-B
PITB Tariff No. 8-B
PITB Tariff No. 6-A
RMTB Tariff No. 23

Source: Prepared by Bishop and Bahler, San Francisco

Section VIII

TRANSPORTATION PROBLEMS OF GENERAL INTEREST TO WESTERN AGRICULTURE

One objective of the research leading to this report was to identify and outline important transportation problems of western agriculture. This section is devoted to a discussion of some of these basic transportation problems of general interest to western agriculture in contrast to the specific transportation matters discussed elsewhere in this report. The purpose of this section is to point out areas in which further research effort appears to be profitable.

The transportation "problems" of an area as large and diverse as the seven western states, or even the three Pacific Coast States, can be stated only in general terms. The detailed ramifications of a transportation problem on one part of the West will be different from those in another section. However, the general areas can be defined and discussed.

It should be emphasized that many of the important problems of agricultural transportation are related directly to transportation problems facing the economy as a whole. Agriculture does not use transportation facilities exclusively, and it is inevitable that many of agriculture's fundamental problems are those common to the entire economy. Also, many of the most important problems are not exclusively western.

Agriculture's interest in transportation falls generally into three categories: (1) the level of freight rates and freight rate relationships among competitive producing areas and between them and the economy generally; (2) the adequacy of service as shown in the availability of required facilities and in the improvement of services offered; and (3) general regulatory policies which have a basic influence on agricultural transportation.

A. Transportation Costs and Western Agriculture

Transportation costs, of course, are of primary interest to western agriculture. The cost involved in moving products to markets or processing centers is a fundamental factor in determining the market area or the profit potential open to the farmer or grower. As a result, it is not surprising that most segments of western agriculture regard costs of transportation as their largest problem.

1. Rates and Competition

Western growers have been deeply concerned with increases in transportation costs over the past decade. This has been particularly true for producers of basic commodities, surplus

to the area in which they are grown, which must be transported over long distances for marketing. In hearings before regulatory commissions, western agricultural interests have continually sought to keep freight rates at the lowest possible level in an attempt to maintain competitive market positions and to expand their market potentials.

An immediate result of the opening of new producing lands is to create potential increases in the supply of farm products. These increased outputs must find markets at reasonable prices, or the economic development of the area may be curtailed. One of the fundamental problems of expanding agricultural areas, therefore, is to find and develop markets for increased amounts of farm products.

Cost of transportation has an important influence on the ability of one area to compete successfully with other areas in market centers. Transportation cost can limit the market for products of a given area, and, of course, affects the net return to farmers and others in the agricultural community. The situation facing potato growers in the Columbia Basin illustrates the position of a newly developed agricultural area which must compete with established producing areas for market outlets. For example, in 1952, there was a potato production of over 1,500,000 bushels[1/] in the Basin. It is probable that potato production in the Basin will increase substantially over the next few years, because potatoes are a cash crop. The Columbia Basin must compete with other areas such as southern Idaho and the Umatilla section of Oregon in marketing its potato output, both in eastern and western markets. As indicated earlier in the report, growers in the Columbia Basin are faced with an unfavorable rate differential in addition to the problems involved in overcoming established area product premiums in the markets. This differential will tend to limit market opportunities and profit potentials for growers in the area.

2. Percentage Rate Increases

Changes in freight rates for agricultural commodities in recent years have had an influence on the markets available to western products. There have been a succession of percentage rail rate increases on a general over-all basis. Estimates of the Bureau of Transport Economics and statistics of the Interstate Commerce Commission, shown in Table 47, indicate that average rail rates for the country as a whole have increased 78.9 percent since June 30, 1946. For the Western District average rail rates have increased 73.6 percent although

1/ Bureau of Reclamation Crop Statistics.

Table 47

ESTIMATES OF AVERAGE OVER-ALL INCREASES IN RAILROAD FREIGHT RATES
AUTHORIZED SINCE JUNE 30, 1946

I.C.C. Docket No.	Date Of Report	Effective Date Of Increase	Rates in Effect Immediately Prior to Increase					Cumulative Rates in Effect On June 30, 1946				
			United States	Eastern District	Pocatella Region	Southern Region	Western District	United States	Eastern District	Pocatella Region	Southern Region	Western District
1	2	3	4	5	6	7	8	9	10	11	12	13
Ex Parte 148-162	6-20-46	7-1-46	6.5	7.0	7.0	4.9	4.9	6.5	7.0	7.0	4.9	4.9
Ex Parte 148-162	12-5-46	1-1-47	10.4	10.2	10.2	11.9	11.9	17.6	17.9	17.9	17.4	17.4
Ex Parte 166	10-6-47	10-13-47	8.9	8.5	6.4	9.2	9.4	28.1	28.0	25.5	28.2	28.5
Ex Parte 166	12-29-47	1-5-48	7.6	7.6	5.5	8.0	8.0	37.8	37.6	32.4	38.5	38.8
Ex Parte 166	4-13-48	5-6-48	3.6	5.5	4.3	3.7	1.7	42.8	45.2	38.0	43.5	41.1
Ex Parte 166	7-27-48	8-21-48	1.0	1.1	3.0	0.3	0.2	44.2	46.8	42.1	44.0	41.3
Cumulative Effect of Ex Parte 166			22.6	24.5	20.5	22.6	20.4	-	-	-	-	-
Ex Parte 168	12-29-48	1-11-49	5.2	5.8	5.9	5.7	4.2	51.7	55.3	50.5	52.2	47.3
Ex Parte 168	8-2-49	9-1-49	3.7	3.7	3.7	3.7	3.6	57.3	61.1	56.0	57.8	52.6
Cumulative Effect of Ex Parte 168			9.1	9.7	9.8	9.6	8.0	-	-	-	-	-
Ex Parte 175	3-12-51	4-4-51	2.4	3.0	2.5	2.0	1.9	61.1	66.0	60.0	60.8	55.5
Ex Parte 175	8-2-51	8-28-51	4.0	4.3	4.1	3.8	3.8	67.6	73.1	66.6	67.0	61.5
Ex Parte 175	4-11-52	5-2-52	6.8	5.9	5.8	7.6	7.5	78.9	83.4	76.2	79.6	73.6
Cumulative Effect of Ex Parte 168			13.8	13.8	12.9	13.9	13.8	-	-	-	-	-

Source: Interstate Commerce Commission, Bureau of Transport Economics and Statistics.

"hold-downs" 1/ have been granted to some agricultural commodities, the cumulative effect of rate increases on agricultural commodities has been substantial.

These percentage rate increases have been of great concern to western producers because of greater distances to consuming areas. Since rates generally are greater for longer distances travelled, the effect of percentage rate increases by distance has the greatest impact on areas furthest from the market. As distance increases, percentage rate increases tend to widen cost differentials among areas closer to markets and those farther away from markets, changing competitive relationships among producing areas. Typical of the problems faced by certain segments of western agriculture is the one expressed by the Northwest Canners Association, Portland, Oregon:

"The Northwest canning industry is apparently at an impasse, as far as further growth is concerned. Extremely heavy increases in freight rates to eastern points have practically erected a barrier at the Rocky Mountains beyond which, in spite of higher quality in the Northwest, the industry cannot compete, not only on most vegetables, but also to some extent on fruits." 2/

It is necessary to analyze the effects of transportation costs on market potentials by individual commodities and by individual areas. The effect of changes in transportation cost on marketing patterns will differ from commodity to commodity and from area to area. Generalizations are dangerous, since for some commodities in certain areas higher freight rates will tend to increase market potentials by excluding products from other areas. However, a brief analysis of the problems facing Pacific Northwest wheat will illustrate the situation.

3. Percentage Rate Increases--Pacific Northwest Wheat

Table 48 illustrates the history of carload rail rates since 1938 on wheat and flour from the Northwest to midwestern points. As Table 48 shows, rates on wheat and flour have been increased substantially over the past ten years. Wheat and flour have not been given the hold-downs that have been granted to other commodities. As a result of the many successive percentage rate increases, the rate relationships among wheat-producing areas have been changed with probable limiting effects on the market potentials of Pacific Northwest wheat.

1/ "Hold-downs" are a method whereby percentage rate increases granted are limited to maximum amounts for each 100 pounds.

2/ From an address presented September 30, 1952, at a meeting of the Pacific Northwest Trade Association, Yakima, Washington, by Robert C. Paulus, on behalf of the Northwest Canners Association.

Tables 49 and 50 show clearly the sharp decline in rail shipments which have occurred during the period of rapid rate increases. On first examination, it would appear that a readjustment of markets had taken place because of the rail rate factor. However, during this same period, because of relief and other international wheat programs, heavy domestic offshore movements of wheat occurred (Appendix Tables A-18 and A-19). These large shipments undoubtedly had a significant influence on the decline in shipments to interior points. Further, part of the decline of rail shipments to California may have resulted from increased truck movements.

Table 48

HISTORY OF CARLOAD RAIL RATES ON WHEAT AND FLOUR 1/
(Cents per Hundred Pounds)

Rate in Effect on	Rate	Increase Authority
September 1, 1935 to March 27, 1938	55	
March 28, 1938	58	Ex Parte 123 (5% Increase)
March 18, 1942	59½	Ex Parte 148 (3% Increase)
May 15, 1943	58	Ex Parte 148 (Increase Suspended)
July 1, 1946	59½	Ex Parte 148 and 162 (3% Increase)
January 1, 1947	66½	Ex Parte 162 (15% Increase)
August 21, 1948	80 2/	Ex Parte 166 (20% Increase)
September 1, 1949	86½ 3/	Ex Parte 168 (8% Increase)
May 17, 1952	97	Ex Parte 175 (12% Increase)

1/ From Oregon, Washington, and Northern Idaho to Minneapolis, and Duluth, Minnesota; Omaha, Nebraska; Kansas City, Missouri; and Sioux City, Iowa.
2/ Includes interim increase of 10 percent, effective October 13, 1947; 20 percent, effective January 15, 1948.
3/ Includes interim increase of 4 percent, effective January 11, 1949.

Source: Pacific Northwest Grain and Grain Products Association.

There is little doubt that the competitive situation of wheat growers in the Pacific Northwest has been injured by percentage rate increases; but the historical data showing declines in rail shipments must be interpreted in light of national policies and the world wheat situation. However, it is almost certain that if foreign shipments of wheat decline, growers in the Pacific Northwest will have to absorb the higher freight costs to midwestern points in order to market their crops. This matter has been discussed in more detail earlier in the report.

Table 49

SHIPMENTS OF WHEAT BY RAIL FROM OREGON, WASHINGTON, AND NORTHERN IDAHO
(Thousands of Bushels)

	Destination						
Crop Years	North Atlantic	Southeast	Midwest	Western States	California	Other States	Total
1946-47	6	538	6,843	1,497	2,683	64	11,631
1947-48	12	81	1,753	848	1,895	9	4,598
1948-49	16	14	984	618	977	2	2,611
1949-50	4	1	1,016	550	747	-	2,318
1950-51	8	-	931	304	735	2	1,980

Sources: Pacific Northwest Grain and Grain Products Association.
Pacific Northwest Wheat Project Study by U. S. Department of Agriculture, Bureau of Agricultural Economics, Agricultural Estimates, Portland, Oregon, in cooperation with the Oregon Wheat Commission and Washington State Department of Agriculture.

Table 50

RAIL SHIPMENT AND WATER SHIPMENT OF FLOUR
FROM OREGON, WASHINGTON, AND NORTHERN IDAHO,
TO EASTERN DESTINATIONS, 1945 THROUGH 1951
(Thousands of Hundred-pound Bags)

	Rail Shipments		Water Shipments	
Year	North of Ohio River	South of Ohio River	North Atlantic	South Atlantic
1945	3,785	408	173	12
1946	2,554	419	591	7
1947	1,336	194	297	6
1948	449	87	16	1/
1949	325	103	24	4
1950	241	95	33	19
1951	164	56	29	19

1/ Less than 1,000 bags.

Source: Pacific Northwest Grain and Grain Products Association.

4. Transportation Efficiency and Costs

a. Carrier Efficiency

The succession of rate increases granted to the carriers has been caused by the increasing costs of the various elements in carrier operations. There is little question but that the carriers' costs have risen greatly over the past decade. Any index of wage and material costs will show these sharp trends. Undoubtedly, there is need for additional revenues for the carriers, but an improved revenue position can be achieved through increases in efficiency of operations as well as by rate increases. Improvement in transportation efficiency is one method by which rates can be reduced or the effects of increased costs of operation can be minimized so that continuing rate increases are not necessary. Only increases in transportation efficiency can, in the long run, decrease the relative size of transportation costs in the marketing process. The railroads in particular have been less successful than some other industries in making the necessary changes to overcome increasing cost factors. Although some progress has been made by the railroads to improve their efficiency, much remains to be done.

The matter of carrier efficiency is, of course, not solely related to western agriculture. It is a problem

for the entire economy. However, the large transportation requirements of western agriculture make the matter vital. Agricultural shippers should study on a continuing basis the fundamental economics of transportation to determine the influences on the rate level of such factors as volume, balance of traffic flow, and the methods and theories of rate construction.

b. <u>Increases in Efficiency of Transportation Not Limited to Carriers</u>

Improvements in efficiency, however, are not limited to the carriers. Although the most obvious area for improvement in transportation efficiency lies in carrier operations, improvements can be made also in the handling and shipping methods utilized by growers, shippers, and marketing agencies which are closely related to the transportation movement itself. These so-called "incidental" functions often offer greater opportunities for improvement in efficiency. For example, attention should be given to the methods of handling and storing commodities, to the methods employed in transporting crops to rail heads or concentration points, to the packaging and packing employed, and to other activities which are part of the transportation function.

c. <u>Reduction in Loss and Damage Claims</u>

Loss and damage to commodities during the transportation process represents a loss which has an impact on transportation costs. The total amount of loss and damage claims paid by Class I railroads in the United States is high, around a hundred million dollars a year recently. A study entitled "Loss and Damage in Rail Transportation of Dressed Beef," issued by the Marketing and Facilities Research Branch of the Production and Marketing Administration, indicates that loss and damage claims paid by Class I railroads on meat shipments have been about one and a half million dollars or more per year. Although statistics are not available for motor transportation, there are indications that loss and damage claims are an important cost factor in truck operations, also.

Claims paid by the carriers do not include all the costs incurred when loss and damage results. Shippers and receivers rarely are reimbursed for all costs that arise in connection with transportation movements when loss and damage occurs. Many incidental costs usually submerged in "overhead" are expended in transportation functions for which no claims can be made. In addition, there are the intangible, but nevertheless large, costs incurred with the loss of customer goodwill when products are not delivered in accordance with contractual arrangements.

Research programs directed toward finding methods to reduce loss and damage through improvements in packaging, stowing, refrigeration, or in other methods related to the transportation movement could produce sizable returns over the long run. It must be recognized, however, that shipping losses could be reduced substantially if the carriers could put into effect what has already been learned through research. This applies particularly to the rough handling at the time of loading and unloading as well as that which occurs in the terminal operations. Any reduction in loss and damage claims would benefit farmers and shippers materially. Even though claims are paid by the carriers, the cost of these losses is ultimately reflected in the rate level. Much of the incidental cost mentioned above is lost as well.

Technological improvements in shipping methods, in containers, in storage, and in materials-handling methods can bring profitable returns. Improvements in efficiency which lead to cost savings are one hope for reduced transportation costs.

5. Rate Inequalities

New agricultural areas often are faced with the problem of removing rate inequalities. Since published rates evolve out of past operations, it sometimes happens that when traffic is generated from and to new points, rate disparities will appear. In newly developed areas, rate inequalities will come to light when commodities start to move to and from points never before served.

During the course of this study, apparent inequalities in rates have appeared in the Columbia Basin. Others will come up as the area develops. "Paper" rates exist on some movements since no traffic has yet developed on commodities which will undoubtedly be produced in the area.

Many of these rate problems will be removed in time through competition among the carriers and through the vigilance and action of traffic managers and others concerned with local development in presenting their difficulties to the carriers for adjustment. However, small shippers and receivers with limited knowledge of traffic and rate matters may encounter some rate problems and may suffer thereby until the inequities are removed.

B. Exemption of Agricultural Commodities from Rate Regulation

Transportation of agricultural commodities by motor carrier has been exempt from rate regulation by the Interstate Commerce Commission through statutory provision. 1/ In addition, similar exemptions have

1/ Interstate Commerce Act. Section 203 (b), Part II.

been provided in state laws covering intrastate movements. The original purpose of these exemptions was (1) to permit farmers to have the greatest possible marketing area; and (2) to facilitate an adequate and flexible supply of for-hire transportation at peak harvesting periods to insure rapid marketing of perishable crops. This exemption of agricultural products from rate regulations has had a great influence on the transportation costs of western agriculture.

1. Basis of Exemption

Under the provisions of the Interstate Commerce Act, 1/ motor vehicles transporting "ordinary livestock, fish (including shell fish) or agricultural (including horticultural) commodities (not including manufactured products thereof)" are exempted from regulation, except for safety, by the Interstate Commerce Commission. In short, the law permits the transportation of agricultural commodities under rates and conditions not subject to review by the Commission.

In addition to this Federal statute, many states have similar laws covering intrastate movement of agricultural commodities. In some areas, these state laws are of greater importance than the Federal statutes from the standpoint of tonnage transported.

2. Broadening the Scope of Exemption

Court decisions have broadened the agricultural exemption in recent years. The wording of the law, which provides exemption when "motor vehicles are not used in carrying any other property, or passengers, for compensation," was originally interpreted by the Interstate Commerce Commission to apply only to those vehicles which were used exclusively in hauling exempt commodities, with the exemption not to apply if the vehicle were used at any time to carry nonexempt products. The courts did not uphold this view, holding that the exemption was lost only when exempt and nonexempt commodities were carried at the same time in the same vehicle. 2/ The scope of agricultural exemptions also has grown through changes in the definition of products to be included within the exemption. 3/

1/ Ibid.
2/ See, for example, I.C.C. v. Dunn, 166 F. 2d 166 (1948) and I.C.C. v. Service Trucking Co., Inc., 186 F. 2d 400 (1951).
3/ Determination of Exempted Agricultural Commodities, 52 M.C.C. 511 (1951).

3. Growth of Exempt Traffic

Available data indicate that there has been a rapid increase in the amount of exempt traffic. Some of this has resulted from the broadening of the interpretation of the measuring of the "exempt" clause. A second factor has been the great increase in agricultural traffic hauled by trucks. Not only has the agricultural traffic handled by motor carriers increased, but also the share of the total agricultural traffic carried by motor vehicle has increased significantly. This is illustrated by Tables 51 and 52. While these statistics do not cover all important movements of agricultural products, such as the movement from the farm to processing plant, they are indicative of the diversion which has occurred since the end of World War II. It is the opinion of many that rate exemption has been one of the leading factors in the diversion of agricultural products from the rail lines to the motor carriers.

The Interstate Commerce Commission has emphasized the growth in exempt traffic in its 67th Annual Report to Congress. In commenting upon traffic growth for the year ended October 31, 1953, the Commission stated that "the greatest relative increase has been in transportation exempt from regulation under the Interstate Commerce Act." It is evident that much of this traffic is in agricultural products.

4. Attempts to Remove Exemption

In recent years there has been much agitation to amend the Interstate Commerce Act to eliminate the exemption. Bills have been introduced in Congress to effect changes. Hearings have been held before Congressional Committees as well as before the Interstate Commerce Commission on the matter.

Support for such elimination has come from the rail carriers, from regulated truck carriers, from some industrial shippers, and from members of the general public such as investors. Those who favor repeal of the exemption clause claim that there has been a great increase in the number and scope of exempt operations, both legal and illegal in nature. These advocates state that the great growth in exempt traffic has a severe effect in reducing the rates and traffic carried by regulated carriers.

Rail carriers have no "exempt" commodities. As a result, one form of transportation is regulated in hauling agricultural commodities while another is not. Regulated highway carriers state that the exemption has diverted agricultural traffic to non-regulated carriers and has resulted in unduly low rates, with consequent effect on the rates of nonexempt commodities.

Table 51

PERCENTAGE OF TOTAL MARKET RECEIPTS OR UNLOADS OF SELECTED COMMODITIES BY TRUCK AT PRINCIPAL MARKETS, 1939-45 PEAK AND 1950

Commodity	Truck Unloads or Receipts As Percent of Total: Percent 1939-45 Peak	Percent 1950
Butter	30	56
Cream	36	66
Shell Eggs	54	93
Dressed Poultry	47	76
Grapefruit	27	43
Oranges	21	33
Sheep and Lambs	34	44
Milk	65	79
Live Poultry	84	99
Calves	67	78
Cheese	22	25
Hogs	70	79
Cattle	69	76
Apples	62	64
Tomatoes	58	60
Potatoes	36	37
Lettuce	43	41

Source: United States Department of Agriculture, Bureau of Agricultural Economics, Transportation of Selected Agricultural Commodities to Leading Markets by Rail and Motortruck, 1939-50, p. 10.

In general, there have been two suggested approaches in making changes. The first would be to regulate all trucks and rail carriers, removing present exemptions. The second would be to exempt rails from regulation when carrying agricultural commodities. Then, of course, there have been a large number of partial changes suggested. Other proponents of removal of the exemption state that exempt truck operations should be limited, as they feel was originally intended by Congress, to transportation from producing areas to primary markets.

Those opposing elimination of the exemption of agricultural products from rate regulation state that any such removal could result in an increase in transportation rates now paid and that the movement of agricultural products demands equipment and services which are largely unavailable from regulated for-hire carriers.

5. <u>Interest of Western Agriculture</u>

Western agriculture has a great interest in this matter because of its great dependence upon truck transportation.

It is readily apparent that one of the fundamental problems surrounding sound decision on this issue is the general lack of data on exempt traffic. Little factual information is available on the magnitude or extent of exempt trucking operations, or on their economic effect on other transportation services and upon agriculture. Studies directed toward the development of these data are required before the question can be adequately dealt with.

6. <u>Relation of "Exempt" Agricultural Traffic to Transportation of Other Commodities</u>

Fundamental to the economic operation of transportation facilities is the balancing of traffic on both outgoing and incoming trips. The nature of the shipment of agricultural products is such that an unbalanced traffic situation often exists, whereby no backhaul is available for agricultural products. In order to provide a return load, the practice of "leasing" a motor vehicle to a shipper for a single trip has been followed. Under this arrangement the truck is considered to be a private carrier and is exempt from regulation. Private motor carriers have also entered the agricultural field by carrying exempt products on the backhaul after delivery of proprietary goods. Another type of trip leasing has occurred by leasing vehicles to regulated for-hire carriers who operate the vehicles under their own rights or authorities.

Table 52

PERCENTAGE CHANGE IN UNLOADS OR RECEIPTS BY RAIL AND BY TRUCK OF SELECTED COMMODITIES AT PRINCIPAL MARKETS, 1939-1950

Product	Unloads and Receipts in 1950 As a Percentage of 1939 By Truck	By Rail
Dressed Poultry	+ 209	- 50
Shell Eggs	+ 91	- 91
Cream	+ 86	- 59
Grapefruit	+ 75	- 41
Milk	+ 62	- 32
Cattle	+ 58	- 18
Potatoes	+ 51	+ 19
Cheese	+ 50	+ 24
Hogs	+ 46	- 17
Apples	+ 38	- 23
Oranges	+ 37	- 34
Tomatoes	+ 35	- 9
Live Poultry	+ 32	- 97
Lettuce	+ 28	+ 34
Butter	+ 18	- 65
Calves	+ 2	- 55
Sheep and Lambs	- 2	- 51

Source: United States Department of Agriculture, Bureau of Agricultural Economics, Transportation of Selected Agricultural Commodities to Leading Markets by Rail and Motortruck, 1939-50. p. 13.

The Interstate Commerce Commission has had under study many plans to restrict trip leasing. The record in the docket on this subject before the Commission is over five years old. The Commission has issued orders limiting trip leasing operations, but the effective dates of these orders have been postponed, the latest postponement until March 1, 1955. In addition, the Commission has partially relaxed a requirement that any lease be made for at least 30 days for vehicles transporting exempt agricultural commodities. The trip leasing question was still unresolved when this report was written.

Another method of developing backhaul has arisen through what are termed "buy and sell" activities whereby truckers engage in merchandising activities for the return trip. Some of these transactions are made with consignees whose purpose is to reduce their transportation costs. This practice arises only in truck transportation since the railroads are specifically forbidden by law to participate in selling the commodities which they carry. The Interstate Commerce Commission has reported that this practice has expanded and that Congress should be aware of its impact on the national transportation policy. In a recent annual report the Commission states:

> In instances where this so-called private carriage is subterfuge for engaging in public transportation, it constitutes a growing menace to shippers and to carriers alike. It is injurious to sound public transportation. It promotes discrimination between shippers and threatens existing rate structures.

The possible impact of this type of operation on the operations of regulated rail and motor carriers is also touched on by the Commission:

> A large amount of freight which would otherwise move by rail or authorized motor carriers is now being transported by motor truck on long distances under the "buy and sell" arrangements.

7. <u>Private Motor Carrier Operations</u>

Private motor carrier operations are involved in many of the problems of exempt transportation. Many large companies have been utilizing their own motor truck fleets, rather than the services of for-hire carriers. In order to maximize

operating efficiency, motor trucks should be filled on both outgoing and incoming trips. As a result, many private carriers have been utilizing exempt agricultural hauls to effect traffic balance.

Further study of the extent of private operations of motor trucks as related to agriculture should be a part of research directed to the area of exempt trucking of agricultural products.

C. Uniform Class Rates and Western Agriculture

Development of a philosophy of uniform class rate has been evident in rate-making over the past several decades. The demands of certain shippers and receivers, particularly of industrial goods, for rate equalization, led to an extensive series of investigations started in 1939 by the Interstate Commerce Commission. Out of these proceedings came the establishment of uniform class rate scales for the rate territories east of the Rocky Mountains. Decisions on the Mountain-Pacific and Transcontinental rate territories were deferred, with the Commission deciding that further investigations should be carried on before the establishment of uniform class rate scales in these areas. These investigations have gone forward under Docket 28300.

It is becoming evident that some basic changes in the over-all class rate structures are likely. One apparent effect would be to reduce many class and commodity rates to and from points in the western part of the United States, although rates on some movements may rise if a provision to alternate rates is not included. Such basic changes in the over-all class rate structures would be of direct concern to agriculture. Should the lower class rates decrease net revenue to the carriers they would most likely seek increased rates elsewhere to maintain their position. On the other hand, it is possible that lower rates would increase the traffic volume and result in higher revenues.

Second, the introduction of rates related to distance will bring about many changes in competitive relationships among commercial centers and among individual industrial plants. However, these could be eliminated by adoption of commodity rates lower than the class rates, so as to stabilize the competitive situation. Any competitive change would have an impact upon agriculture through its relationships with other segments of the economy.

In addition, the traditional relationships of commodity rates to class rates is almost certain to cause an impact on commodity rates themselves when new uniform class rates become effective. These changes may upset present competitive situations among agricultural areas, creating new problems for some and improving

the positions of others. Any changes are almost certain to have an impact upon interregional competition.

This matter of uniform class rates is an extremely complex one and will involve much detailed analysis to determine the ramifications of rate structure changes upon western agriculture. However, the problem is one that should be studied continually. Research programs designed to analyze the rate structures and their effect upon agriculture in the broad sense should include a study of this kind. Any changes in the freight rate relationship among manufactured goods and agricultural products may have far-reaching significance.

It should be noted that difficulties will confront any attempts to determine the impact of basic changes in the freight rate structure on western agriculture. There is a general lack of adequate rate and movement data which can be utilized. Those unacquainted with rate and traffic matters are amazed and frustrated to find that there are very little developed data on the extent and size of rate differentials. Rate data usually cannot be developed without extensive research through complex and technical tariffs, requiring the expenditure of large amounts of research time. Part of the failure to evaluate quantitatively the effects of rate changes stems from the extensive efforts required to develop the necessary data.

Also, the economic effects of rate changes cannot be determined by transportation data alone. Other cost factors, such as production and marketing costs, must be analyzed to determine the impact of rate changes upon the competitive situation of different agricultural areas, commercial areas, and industrial companies.

D. Transportation Barriers Among the States

One of the major transportation problems of western agriculture is the long recognized existence of barriers restricting the movement of agricultural commodities among the states. Some of these barriers have arisen as a part of efforts to protect the health and safety of the people. Others have been imposed to offset the effects of unethical or questionable marketing and distributing practices. Still others have resulted from attempts to protect the markets or interests of one area as opposed to another.

As far as transportation is concerned, these barriers affect primarily the movement of commodities by truck. However, the great importance of truck transportation in the transportation of agricultural commodities within and out of the western states makes the problem a serious one. Much attention has been given to this problem over the years. Some progress has been made in removing barriers through cooperation among the states. However, the problem still remains, and must be mentioned in any discussion of the major transportation problems of western agriculture. Although extensive research effort has been directed toward identifying and listing these trade barriers, much remains to be done in measuring and evaluating the economic effects of such barriers on western agriculture.

1. Limitations on Physical Characteristics of Vehicles and Loads

a. Size and Weight Limitations

Size and weight limitations for motor trucks and loads have been established for such reasons as safety and the protection of highway construction. These restrictions take the form of gross weight limits for single vehicles and vehicle combinations, limits on axle load, length of vehicles and combinations, and other dimensional factors.

The restrictions have impeded the movement of commodities among states because of the variance in these size and weight limitations from state to state. These variances have decreased the flexibility of movement of motor trucks, since equipment suitable in one state cannot be fully utilized in others. Weight and dimension restrictions sometimes require that motor carriers change equipment in operating across certain states. Transcontinental motor carriers report that North Dakota laws prohibit the operation of full trucks and trailers over the highways of the state. This restriction forces transcontinental motor carriers to change to semi-truck and trailer equipment near the state line, when they might prefer to use their full truck and trailer equipment which can be used in other states. Physical restrictions such as these impose operating problems upon motor carriers which, in turn, have an impact upon the total costs of transportation. In addition, restrictions such as these which cause equipment changes, affect in turn time of delivery, which affects adversely the costs incurred by shippers and receivers of freight, entirely apart from the effects on the direct cost of transportation.

In recent years, the western states have been able to remove many of the variances in these physical limits, so that movement within the area is not affected as much as movement to points outside of the West (so far as physical limitations are concerned). However, much still remains to be accomplished.

b. Equipment Carried

Many state laws specify that motor trucks operating within the state's boundaries must carry in good condition certain operating equipment such as lights, mufflers, brakes, windshield wipers, etc. These requirements are written primarily to promote safety and are relatively minor in their effect upon the movement of agricultural products across state boundaries.

However, there are variations in the scope of these laws and in the manner in which they are administered that affect motor truck operators. These variations cause minor operating problems which are particularly bothersome to small operators not aware of the scope and extent of the variations.

2. Taxation and Fees

Great variations exist in the amount and type of taxes and fees levied upon trucks by the states. Some states have low registration fees coupled with high fuel taxes. In other states the reverse is true. Other states have gross receipt taxes, while others have ton-mile or weight-mile assessments whereby taxes are computed on the basis of the weight of the vehicle and/or load and the distance travelled.

There is little question that the flexibility of truck operations is hindered by both the amount of taxes and fees assessed, and by the variance from state to state. Although reciprocity arrangements have been made among some states to lessen this problem, the degree of reciprocity is limited. Variations exist in very serious form. True reciprocity can exist only through uniformity. Also, there is some indication that reciprocity has had some set-backs in recent years.

Motor truck operators must carefully analyze the effect of operating in one state vehicles registered in another state. In some cases, it may not be economically feasible for trucks to cross state lines. On the other hand, an operator may find it desirable to license only a part of his fleet in other states, thus creating problems in the physical dispatch of vehicles.

3. Operating Restrictions on Truckers

a. Certificates of Public Convenience and Necessity and Permits

Truckers operating as common carriers usually must obtain certificates of public convenience and necessity. The requirements for such certificates vary extensively. The "rights" accruing to such certificates also differ between states.

There are also certificates or "permits" required for contract carriers. The requirements for this type of carrier also vary considerably.

b. Financial Responsibility Requirements and Insurance Requirements

Many states require that truckers operating over their highways demonstrate financial responsibility to respond to claims for damages for death or injury in case of accidents. In addition, other states require specified amounts of public liability and property damage insurance. Also, some states require certain forms of cargo insurance to protect shippers and receivers in the event of cargo damage in transit. These laws differ from state to state, creating operating problems.

c. Reports Required

Some states require the filing of operating reports of various kinds. These reporting requirements vary greatly from state to state.

d. Equipment Inspections

Equipment inspections for safety purposes are required in many states. These inspections and their variance in type and frequency among the states also create operating problems.

e. Merchant Trucker Laws

Limitations on the activities of merchant or itinerant truckers exist in most states, restricting the movement of truckers of this type among the states.

f. Ports of Entry Requirements

In order to assist in the enforcement of their laws, some states have set up ports of entry legislation to control the movement of motor vehicles into and out of

the state. These ports of entry requirements impose an additional operating requirement upon truck operations.

4. Container Restrictions

Laws and regulations regarding containers also influence the transportation of commodities. Some states specify the weights and measures to be used in measuring the volumes of commodities. Others require the marking of weights on the package. Other laws prescribe standard weights for commodities and packages. All of these requirements and their wide variation among the states tend to restrict flexibility of movement.

5. Restrictions on Transportation of Commodities

Plant and animal quarantines sometimes restrict the interstate movement of specific commodities such as meat, cattle, milk, horses and mules, fruits and vegetables, hay, nursery and florist stock, and others. These regulations vary greatly among the states. Their influence in restricing movement of traffic differs from one commodity to another, but their existence lessens the flexibilities of transport.

E. Allocation of Costs of Highway Construction and Maintenance

One of the basic transportation problems facing the West today is the question of finding sufficient revenues for the construction, maintenance, and improvement of highways and roads. With the great growth in population combined with significant increases in economic development have come great increases in highway traffic which have created large deficiencies in the highway and road system. This great increase in highway demand has developed during a period in which much road construction and maintenance has been deferred as a result of war requirements on the economy. The combination of great increases in traffic with the accumulation of deferred construction and maintenance projects has seriously aggravated the problem.

The costs involved in removing the deficiencies in the highway and road system are staggering. To bring the highway system up to adequate levels will require many millions of dollars. The problem of developing sufficient revenues has been compounded through inflationary forces which have greatly increased costs of highway construction.

Great controversy rages over who should pay the costs of highway construction and maintenance. There are those who argue that the users of highways, trucks and automobiles, should pay the entire bill for highway costs. On the other hand, there are substantial arguments that other beneficiaries of an adequate road and highway system should also bear a share of the cost. Some of

the economic benefits that may accrue as a result of improved highways and roads are accelerated economic development of areas, increases in the value of properties, decreased production and distribution costs, and similar factors.

Much controversy also has developed as to the costs that individual users of the highways should pay. Typical is the debate over the question of whether or not trucks of various kinds are bearing their full share of the highway burden. At the present time, little factual data have been developed in the attempt to determine how much of the costs of construction and maintenance of highways is attributable to different types of vehicles. It appears that even if data on incremental costs are developed, it is still necessary to apportion costs common to all users. This apportionment requires the development of formulas which most appropriately allocate costs to the users of the facilities. Much remains to be done in developing cost data to assist in the preparation of an equitable allocation formula.

Because of agriculture's interest in highways and roads, the problem of allocation of construction costs is of major importance and should be considered in the development of a research program.

A specific problem in this area that needs further analysis is the effect of ton-mile, or weight-distance, fees for trucks on the costs and operations of motor carriers. This type of fee is devised to assess fees on the basis of two factors: the weight of the truck and the distance it travels. Fee schedules, in some states, are established so that the fees rise sharply in the upper weight limits. The theory lying behind this method of fee assessment is that the larger and heavier trucks require more expensive roads and highways. The distance-travelled factor is included since it is considered that use of the highway is also related to maintenance and depreciation costs of highways.

Oregon and New York have enacted similar ton-mileage tax laws. Modified forms are also in effect in several other states such as Wisconsin, Colorado, and Kansas.

This tax has been the center of much controversy, and extensive but unsuccessful efforts recently were made by the trucking industry in Oregon to have the law repealed. Because of the heavy truck movement of agricultural products a study of the effects of this tax from the viewpoint of agriculture would provide data upon which policy decisions could be based. Factual information would be helpful in resolving controversies over the economic effects of this type of tax on for-hire motor carrier operations, on private truck operations, and upon the users of motor carrier services.

F. Other Transportation Problems of Interest to Western Agriculture

There are other transportation problems of general interest to western agriculture which should be mentioned here. All of these could not be developed fully under the scope of the present research contract. However, three of them are briefly discussed below because of their importance.

1. Long-and-Short-Haul Clause

Section 4, Part I, of the Interstate Commerce Act is designed to prevent rail carriers from charging higher rates for a shorter than for a longer haul over the same line or route in the same direction, if the shorter is included within the longer distance. It also provides a mechanism whereby, upon special action, the Interstate Commerce Commission may permit exceptions to this clause in the Act. The original purpose of the long-and-short-haul clause was to protect shippers from discrimination usually brought about by the existence of rail and water competition on the longer haul and without such competition on the shorter.

Substantial pressure has been developing to repeal or amend Section 4, Part I, of the Interstate Commerce Act. The rail carriers and others feel that the provisions of this section of the Interstate Commerce Act make it difficult for them to compete with motor and water carriers, including those exempt from rate regulation. The rail carriers would like to be able to reduce rates where necessary to meet the competition of other carriers on specific hauls of particular commodities without revising their over-all rate structures.

On the other hand, motor carriers, water carriers, and shippers who would be adversely affected by repeal of the clause, would like to keep the long-and-short-haul clause intact.

It is obvious that the effects of any changes as basic as modification of the long-and-short-haul clause will have an important impact upon agriculture, at least in some geographical areas. The nature of the effect upon specific areas and specific commodities is complex and can only be determined by detailed study. However, the importance to western agriculture of any basic changes in long-and-short-haul philosophy suggests that full consideration be given to studies which would indicate more specifically the effects of such changes.

2. Diversion of Traffic from Rail to Motor Carriers

It is apparent that over the past few years there has been a diversion of traffic from rail cars to trucks. This

diversion has been significant in agricultural commodities, as Tables 51 and 52 indicate. Table 51 illustrates clearly the rapid rise in the percentage of the total market receipts or unloads carried by truck. Table 52 shows that not only has the percentage of the total traffic carried by truck increased, but in most cases the absolute amounts carried by the rails have declined.

Why has this diversion taken place? Is it because of better service, or because of lower rates? Is it because of the "exempt" features of motor carrier regulation? Will the trend toward diversion continue? If it does, what are the implications to rail carrier revenues? Will commodities "tied to the rails" be assessed higher rates because of the diversion, or are the railroads finding additional revenues through increased carriage of nonfarm commodities?

These questions are only part of the problem. Statistical data are available which indicate that diversion has taken place, but further work is needed to determine the fundamental causes of diversion and the economic impact of these diversions.

3. Impact of Improved Inland Waterway Transportation on Agriculture in the Pacific Northwest

As indicated earlier in the report, projects now under way on the Columbia River are designed to improve navigability for inland waterway traffic. It is hoped by many that ultimately inland waterway traffic will be possible all the way to Lewiston, Idaho. This would permit inland waterway shipment of wheat and peas from the Palouse region to the Pacific Coast.

The development of an improved inland waterway system will have an impact upon transportation services in the areas served by the River. The development of a system of transportation competing with truck and rail transport will influence over-all transportation services in many ways, and may improve the position of certain shippers by offering an alternative form of transportation.

Although considerable study has been made of the capacities of the Columbia and Snake Rivers as an inland waterway and of potential traffic movements, principally by the Corps of Engineers, little study has been made of the economic effects of the availability of inland waterway services. One influence may be lowered transportation rates by competing carriers. In many instances where inland waterway service is available, rail and truck rate structures are lowered to meet competitive rates, so that there is little substantial diversion of traffic to the inland waterway carriers.

The possibility of routing by the inland waterway should be explored. Location of shipping and destination points may be such that use of the inland waterway is practical, or it may not be feasible. The total cost of shipping by inland waterway also should be analyzed. In many cases, a surface movement may be required on both ends of the river haul. Handling costs involved might make the total cost of shipment by inland waterway higher than shipment by all-rail or all-truck.

The balance of traffic flow should be studied to determine whether or not barges can operate with full loads on both up-river and down-river runs. This analysis should be broken down by requirements for different types of barge equipment, such as bulk oil carriers or refrigerated facilities. It should also include data on seasonal requirements.

The economic implications of improved navigation on the Columbia River are of great concern to areas served by the river. This problem deserves full analysis because of its significance to agriculture in providing an alternative form of transportation, and because of its over-all importance to the economic development of the Pacific Northwest.

4. Adequacy of Transportation and Distribution Facilities for Frozen Foods

In the course of the present research project, the matter of the adequacy of transportation and distributing facilities for handling frozen foods was frequently raised by persons contacted during the field studies. Shippers generally expressed concern over the availability of adequate facilities for the marketing of frozen foods, particularly in view of anticipated further growth in the industry.

There has been a substantial growth in frozen food production in recent years. Table 44 outlines production figures for fruits and vegetables in the eleven western states—two important items in frozen food production. This growth has brought with it physical facility problems in the handling, transportation, storage, distribution, and marketing of frozen foods. Some of these problems are illustrated by the following statements:

> "The Transportation Committee of the National Association of Frozen Food Packers has requested transportation and warehousing of frozen foods at a maximum of 0°F. The warehousemen have met this requirement, but to date there are comparatively few rail cars that can transport frozen foods at this temperature."1/

1/ H. C. Emerson. "Shipping Hard Frozen Foods by Rail and Truck," Refrigeration Engineering, LIX (1951), p. 863.

"There are several factors retarding the growth of trucking of frozen foods. One is the lack of a national organization to coordinate trucking throughout the country; many times trucks in sufficient quantity are not available at shipping point when desired. Schedules are indefinite and arrival times are hard to guarantee. Several states have unreasonable size and weight laws which result practically in road blocks. Not enough truckers are using recording thermometers while en route. Current difficulty in further development of equipment is due to the war effort which has created shortages of aluminum, stainless steel, and many alloys necessary for lightweight, yet strong, equipment."1/

Much of the production of fruits and vegetables in expanding agricultural areas such as the Columbia Basin must be processed if it is to be marketed. The frozen food market appears to offer a promising method of marketing fruit and vegetable production. However, one essential to the continuing expansion of the frozen food processing industry is the availability of facilities to transport, market, and distribute frozen foods. Facilities must be available at the processing point, in transportation equipment, at warehouses, in wholesale and retail outlets, and in the homes of the ultimate consumer.

Enough questions as to the adequacy of facilities for handling frozen foods were raised to warrant full consideration of research pointed toward further analysis of this subject.

1/ T. G. Lumbra. "Truck Transportation of Perishables," Refrigeration Engineering, LIX (1951), p. 864.

Table A-1

ESTIMATED POPULATION AND TOTAL INCOME PAYMENTS TO INDIVIDUALS
PACIFIC SLOPE STATES AND THE UNITED STATES
1952 AND PROJECTED 1955-1975

POPULATION
(Thousands)

Year	California	Idaho	Washington	Oregon	Arizona	Utah	Nevada	Total Pacific Slope	Total United States	Pacific Slope as Percent of United States
1952	11,390	592	2,462	1,604	871	737	184	17,840	155,767	11.4%
1955	12,700	630	2,650	1,750	1,000	780	200	19,710	165,000	12.0
1960	14,900	700	2,970	1,950	1,130	850	230	22,730	176,000	12.9
1963	16,400	770	3,170	2,060	1,200	900	240	24,740	183,000	13.5
1965	17,300	790	3,300	2,150	1,270	930	250	25,990	188,000	13.8
1970	19,800	860	3,640	2,400	1,410	1,010	280	29,400	200,000	14.7
1975	22,340	940	4,010	2,650	1,650	1,100	300	32,990	214,000	15.6

TOTAL INCOME PAYMENTS TO INDIVIDUALS
(Millions of 1952 Dollars)

Year	California	Idaho	Washington	Oregon	Arizona	Utah	Nevada	Total Pacific Slope	Total United States	Pacific Slope as Percent of United States
1952	$23,146	$ 874	$4,466	$2,763	$1,287	$1,069	$405	$34,010	$255,367	13.3%
1955	24,719	995	5,050	3,088	1,322	1,179	415	36,768	278,000	13.2
1960	27,711	1,114	5,668	3,481	1,504	1,321	468	41,267	306,000	13.5
1963	30,104	1,209	6,162	3,795	1,650	1,434	510	44,864	329,000	13.6
1965	31,675	1,271	6,486	4,000	1,745	1,509	538	47,224	344,000	13.7
1970	36,312	1,455	7,443	4,608	2,028	1,729	620	54,195	387,000	14.0
1975	40,725	1,629	8,355	5,187	2,305	1,938	698	60,837	429,000	14.2

1/ "Income payments to individuals" is a measure of the income received from all sources during the calendar year by the residents of each state.

Sources: 1952 population from Bureau of the Census, Estimates of the Population of States 1950-1952, November 24, 1953. 1952 income data from United States Department of Commerce, "Total Income Payments to Individuals, by States and Regions, 1929-53," Survey of Current Business, August 1953. P.12. Projections by Stanford Research Institute.

Table A-2

USE OF LAND SUITABLE FOR FARMING AND GRAZING
ON THE PACIFIC SLOPE
1920-1950
(Thousands of Acres)

	1920	1930	1940	1950
LAND IN FARMS				
Irrigated Land				
Cropland Harvested	n.a.	8,024	8,114	10,401
Pasture	n.a.	n.a.	1,824	2,550
Total	n.a.	n.a.	9,938	12,951
Cropland Harvested				
Feed Crops 1/	9,060	9,001	8,711	10,214
Nonfeed Crops	8,074	9,300	9,041	11,431
Total	17,134	18,301	17,792	21,645
Land in Pasture	(48,604) 2/	58,658	(81,638) 2/	107,162
Other Land in Farms 3/	(12,000) 2/	13,135	(14,900) 2/	16,572
Total Land in Farms	77,738	90,094	114,330	145,379
GRAZING LAND OUTSIDE OF FARMS 4/	(276,366)	(264,010)	(239,774)	208,725
Total Farm and Grazing Land	354,104	354,104	354,104	354,104

Note: Parentheses denote estimates.

1/ Feed crops include corn, oats, barley, sorghum, cotton and all hay crops.

2/ Other land in farms estimated, total land pastured taken as a residual in 1920 and 1940.

3/ Other land in farms includes houselots, roads, wasteland, etc., and cropland not harvested and not pastured, and woodland not pastured.

4/ Grazing land outside of farms estimated as a residual of land in farms and land not suitable for farming or grazing.

Table A-3

LAND USE IN THE PACIFIC SLOPE STATES AND THE UNITED STATES[1]
1950
(Thousands of Acres)

	California	Idaho	Washington	Oregon	Arizona	Utah	Nevada	Total Pacific Slope	United States
Total Land Area	100,314	52,972	61,642	42,743	72,688	52,701	70,265	453,325	1,903,825
Land Unsuitable for Farming or Grazing	33,901	12,168	10,139	15,614	7,622	8,901	10,876	99,221	345,095
Woodland not grazed	21,488	8,392	8,238	12,852	2,696	2,120	2,307	58,093	201,076
Other[2]	12,413	3,776	1,901	2,762	4,926	6,781	8,569	41,123	144,019
Grazing Land Outside of Farms	29,800	27,580	31,175	9,760	25,150	32,935	52,325	208,725	400,164
Land in Farms	36,613	13,224	20,328	17,369	39,916	10,865	7,064	145,379	1,158,566
Irrigated Land	6,288	2,107	1,206	571	942	1,118	719	12,951	25,788
Cropland Harvested	5,310	1,704	839	449	839	847	413	10,401	n.a.
Pasture	978	403	367	122	103	271	306	2,550	n.a.
Total Cropland Harvested	7,957	3,648	3,219	4,237	884	1,279	421	21,645	344,399
Feed Crops[3]	4,301	1,528	1,450	1,050	766	719	400	10,214	236,249
Non-Feed Crops	3,656	2,120	1,769	3,187	118	560	21	11,431	108,150
Total Land Pastured	23,364	7,353	14,252	8,954	38,233	8,575	6,431	107,162	619,696
Other[4]	5,292	2,223	2,857	4,178	799	1,011	212	16,572	194,471

1/ Data from Bureau of the Census, Census of Agriculture 1950.
2/ Includes cities, parks, roads, desert, swamps, dunes, etc.
3/ Includes corn, oats, barley, sorghum, cotton, and all hay crops.
4/ Includes houselots, roads, wasteland, etc., and cropland not harvested and not pastured, and woodland not pastured.

Table A-4

ICC WAYBILL SAMPLE OF RAIL SHIPMENTS OF BUTTER, 1952
(Volume in Tons)

	Origin											
Destination	Calif.	Idaho	Wash.	Ore.	Ariz.	Utah	Nev.	Total Pacific Slope	Four Mountain States	Other States	Total U. S.	Percent of U. S.
Pacific Slope												
California	34	0	0	0	0	0	0	34	0	174	208	7.94%
Idaho	0	0	0	0	0	0	0	0	0	0	0	0.00
Washington	0	0	18	0	0	0	0	18	0	37	55	2.10
Oregon	0	0	0	0	0	0	0	0	0	32	32	1.22
Arizona	0	0	0	0	0	0	0	0	0	0	0	0.00
Utah	0	0	0	0	0	0	0	0	0	0	0	0.00
Nevada	0	0	0	0	0	0	0	0	0	0	0	0.00
Total	34	0	18	0	0	0	0	52	0	243	295	11.26
Four Mountain States	0	0	0	0	0	0	0	0	0	0	0	0.00
Other States	0	0	0	0	0	0	0	0	0	2,325	2,325	88.74
Total United States	34	0	18	0	0	0	0	52	0	2,568	2,620	100.00%
Percent of United States	1.30%	0.00%	0.69%	0.00%	0.00%	0.00%	0.00%	1.99%	0.00%	98.01%	100.00%	

Source: Interstate Commerce Commission, Carload Waybill Analyses, 1952. Statement No. 5143.

Table A-5

TOTAL SUPPLY OF CHEESE
AND CREAMERY BUTTER IN CALIFORNIA, 1949
(Thousand Pounds)

	Cheese 1/		Creamery Butter	
PRODUCTION 2/		9,573		36,734
Inshipments to San Francisco 3/				
Idaho, Washington, Oregon	5,775		3,270	
Arizona, Utah, Nevada	75		177	
Other States, excl. California	8,498		9,992	
Total	14,348		13,439	
Inshipments to Los Angeles 3/				
Idaho, Washington, Oregon	11,134		13,391	
Arizona, Utah, Nevada	894		533	
Other States, excl. California	15,167		14,432	
Total	27,195		28,356	
TOTAL INSHIPMENTS		41,543		41,795
TOTAL SUPPLY		51,116		78,529
Intrastate Shipments				
San Francisco receipts	2,826		14,370	
Los Angeles receipts	998		5,052	

1/ Excludes full skim American and cottage cheese.

2/ Production of Manufactured Dairy Products, 1949, Bureau of Agricultural Economics, U. S. Department of Agriculture, Washington 25, D. C. Statistical Bulletin No. 93, November 1950, Tables 23 and 27.

3/ Dairy and Poultry Statistics, 1949, Production and Marketing Administration, U. S. Department of Agriculture, Statistical Bulletin No. 87, May 1950, Tables 16 and 21.

Table A-6

ICC WAYBILL SAMPLE OF RAIL SHIPMENTS OF CHEESE, 1952
(Volume in Tons)

Destination	Origin: Calif.	Idaho	Wash.	Ore.	Ariz.	Utah	Nev.	Total Pacific Slope	Four Mountain States	Other States	Total U. S.	Percent of U. S.
Pacific Slope												
California	0	0	0	59	0	0	0	59	0	110	169	5.66%
Idaho	0	0	0	0	0	0	0	0	0	115	115	3.85
Washington	0	0	0	0	0	0	0	0	0	73	73	2.45
Oregon	0	0	0	0	0	0	0	0	0	71	71	2.38
Arizona	0	0	0	0	0	0	0	0	0	15	15	0.50
Utah	0	0	0	0	0	0	0	0	0	0	0	0.00
Nevada	0	0	0	0	0	0	0	0	0	0	0	0.00
Total	0	0	0	59	0	0	0	59	0	384	443	14.84
Four Mountain States	0	0	0	0	0	0	0	0	0	31	31	1.04
Other States	0	0	0	0	0	0	0	0	0	2,510	2,510	84.12
Total United States	0	0	0	59	0	0	0	59	0	2,925	2,984	100.00%
Percent of United States	0.00%	0.00%	0.00%	1.98%	0.00%	0.00%	0.00%	1.98%	0.00%	98.02%	100.00%	

Source: Interstate Commerce Commission, Carload Waybill Analyses, 1952, Statement No. 5143.

Table A-7

ICC WAYBILL SAMPLE OF RAIL SHIPMENTS OF CATTLE AND CALVES, 1952
(Volume in Tons)

	Origin											
Destination	Calif.	Idaho	Wash.	Ore.	Ariz.	Utah	Nev.	Total Pacific Slope	Four Mountain States	Other States	Total U. S.	Percent of U. S.
Pacific Slope												
California	0	461	0	91	0	275	150	977	595	781	2,353	6.03%
Idaho	0	94	0	22	0	35	0	151	132	11	294	0.75
Utah	0	63	0	24	0	0	0	87	262	23	372	0.95
Oregon	0	85	0	56	0	0	0	141	10	0	151	0.39
Arizona	0	26	0	0	0	0	0	26	138	312	476	1.22
Utah	0	44	0	0	0	82	0	126	85	1	212	0.54
Nevada	0	12	0	11	0	0	55	78	31	17	126	0.32
Total	0	785	0	204	0	392	205	1,586	1,253	1,145	3,984	10.20
Four Mountain States	0	33	0	0	0	19	0	52	650	923	1,625	4.17
Other States	0	43	0	12	0	8	0	63	4,754	28,588	33,405	85.63
Total United States	0	861	0	216	0	419	205	1,701	6,657	30,656	39,014	100.00%
Percent of United States	0.00%	2.21%	0.00%	.55%	0.00%	1.07%	.52%	4.35%	17.06%	78.59%	100.00%	

Source: Interstate Commerce Commission, Carload Waybill Analyses, 1952. Statement No. 5143.

Table A-3

ICC WAYBILL SAMPLE OF RAIL SHIPMENTS OF SHEEP AND LAMBS, 1952
(Volume in Tons)

Destination	Origin: Calif.	Idaho	Wash.	Ore.	Ariz.	Utah	Nev.	Total Pacific Slope	Four Mountain States	Other States	Total U. S.	Percent of U. S.
Pacific Slope												
California	76	128	0	0	0	80	20	304	53	71	428	7.59%
Idaho	10	109	20	10	0	20	10	179	35	0	214	3.79
Washington	0	9	61	20	0	0	0	90	25	0	115	2.03
Oregon	0	27	11	11	0	0	0	49	10	0	59	1.04
Arizona	0	0	0	0	21	11	0	32	50	0	82	1.45
Utah	10	32	0	0	0	266	0	308	68	0	376	6.66
Nevada	0	0	0	0	0	0	10	10	11	0	21	.37
Total	96	305	92	41	21	377	40	972	252	71	1,295	22.93
Four Mountain States	0	10	10	10	9	61	0	100	540	50	690	12.23
Other States	70	204	10	31	42	97	10	464	833	2,367	3,664	64.84
Total United States	166	519	112	82	72	535	50	1,536	1,625	2,488	5,649	100.00%
Percent of United States	2.95%	9.20%	1.98%	1.45%	1.27%	9.47%	.89%	27.21%	28.77%	44.02%	100.00%	

Source: Interstate Commerce Commission, Carload Waybill Analyses, 1952. Statement No. 5143.

Table A-9

ICC WAYBILL SAMPLE OF RAIL SHIPMENTS OF HOGS, 1952
(Volume in Tons)

	Origin											
Destination	Calif.	Idaho	Wash.	Ore.	Ariz.	Utah	Nev.	Total Pacific Slope	Four Mountain States	Other States	Total U. S.	Percent of U. S.
Pacific Slope												
California	0	20	0	0	0	0	0	20	0	1,694	1,714	12.64%
Idaho	0	26	0	0	0	0	0	26	0	24	50	.37
Washington	0	80	0	0	0	0	0	80	0	332	412	3.04
Oregon	0	53	0	0	0	0	0	53	0	235	288	2.12
Arizona	0	0	0	0	0	0	0	0	0	190	190	1.40
Utah	0	13	0	0	0	0	0	13	0	123	136	1.01
Nevada	0	0	0	0	0	0	0	0	0	14	14	.10
Total	0	192	0	0	0	0	0	192	0	2,612	2,804	20.68
Four Mountain States	0	0	0	0	0	0	0	0	29	130	159	1.17
Other States	0	0	0	0	0	0	0	0	9	10,589	10,598	78.15
Total United States	0	192	0	0	0	0	0	192	38	13,331	13,561	100.00%
Percent of United States	0.00%	1.42%	0.00%	0.00%	0.00%	0.00%	0.00%	1.42%	.28%	98.30%	100.00%	

Source: Interstate Commerce Commission, Carload Waybill Analyses, 1952. Statement No. 5143.

Table A-10

ICC WAYBILL SAMPLE OF RAIL SHIPMENTS OF FRESH MEATS, 1952
(Volume in Tons)

	Origin											
Destination	Calif.	Idaho	Wash.	Ore.	Ariz.	Utah	Nev.	Total Pacific Slope	Four Mountain States	Other States	Total U. S.	Percent of U. S.
Pacific Slope												
California	277	0	0	0	0	0	0	277	0	369	646	2.46%
Idaho	0	0	0	0	0	0	0	0	0	23	23	0.09
Washington	49	0	33	0	0	31	0	113	35	91	239	0.91
Oregon	0	0	0	0	0	0	0	0	0	12	12	0.05
Arizona	0	0	0	0	0	0	0	0	0	0	0	0.00
Utah	0	0	0	0	0	0	0	0	0	0	0	0.00
Nevada	0	0	0	0	0	0	0	0	0	0	0	0.00
Total	326	0	33	0	0	31	0	390	35	495	920	3.51
Four Mountain States	0	0	0	0	0	12	0	12	26	82	120	0.46
Other States	41	0	13	0	0	11	0	65	740	24,394	25,199	96.03
Total United States	367	0	46	0	0	54	0	467	801	24,971	26,239	100.00%
Percent of United States	1.40%	0.00%	.18%	0.00%	0.00%	.21%	0.00%	1.79%	3.05%	95.16%	100.00%	

Source: Interstate Commerce Commission, Carload Waybill Analyses, 1952, Statement No. 5143.

Table A-11

ICC WAYBILL SAMPLE OF RAIL SHIPMENTS OF CURED MEATS, 1952
(Volume in Tons)

	Origin											
Destination	Calif.	Idaho	Wash.	Ore.	Ariz.	Utah	Nev.	Total Pacific Slope	Four Mountain States	Other States	Total U. S.	Percent of U. S.
Pacific Slope												
California	21	0	0	0	0	0	0	21	0	1,647	1,668	16.59%
Idaho	0	0	0	0	0	0	0	0	0	0	0	00.00
Washington	20	0	0	0	0	0	0	20	0	258	278	2.77
Oregon	0	0	0	0	0	0	0	0	0	108	108	1.07
Arizona	0	0	0	0	0	0	0	0	0	31	31	0.31
Utah	0	0	0	0	0	0	0	0	0	51	51	0.51
Nevada	0	0	0	0	0	0	0	0	0	0	0	00.00
Total	41	0	0	0	0	0	0	41	0	2,095	2,136	21.25
Four Mountain States	0	0	0	0	0	0	0	0	0	74	74	0.74
Other States	0	0	0	0	0	0	0	0	0	7,844	7,844	78.01
Total United States	41	0	0	0	0	0	0	41	0	10,013	10,054	100.00%
Percent of United States	.41%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	.41%	0.00%	99.59%	100.00%	

Source: Interstate Commerce Commission, Carload Waybill Analyses, 1952, Statement No. 5143.

Table A-12

ICC WAYBILL SAMPLE OF RAIL SHIPMENTS OF POTATOES, 1952
(Volume in Tons)

Destination	Calif.	Idaho	Wash.	Ore.	Ariz.	Utah	Nev.	Total Pacific Slope	Four Mountain States	Other States	Total U. S.	Percent of U. S.
	Origin											
Pacific Slope												
California	1,530	742	54	923	0	78	0	3,327	0	207	3,534	9.46%
Idaho	33	179	0	18	0	0	0	230	0	0	230	.62
Washington	216	102	411	62	0	0	0	791	20	70	881	2.36
Oregon	210	20	56	180	0	0	0	466	66	20	552	1.48
Arizona	36	45	0	0	0	0	0	81	0	0	81	.22
Utah	56	0	0	0	0	0	0	56	0	0	56	.15
Nevada	0	0	0	0	0	0	0	0	0	0	0	0
Total	2,081	1,088	521	1,183	0	78	0	4,951	86	297	5,334	14.29
Four Mountain States	120	72	18	18	18	0	0	246	278	44	568	1.52
Other States	4,476	5,491	1,004	651	297	0	20	11,939	1,824	17,682	31,445	84.19
Total United States	6,677	6,651	1,543	1,852	315	78	20	17,136	2,188	18,023	37,347	100.00%
Percent of United States	17.88%	17.81%	4.13%	4.96%	.84%	.21%	.05%	45.88%	5.86%	48.26%	100.00%	

Source: Interstate Commerce Commission, Carload Waybill Analyses, 1952. Statement No. 5143.

Table A-13

ICC WAYBILL SAMPLE OF RAIL SHIPMENTS OF WHEAT, 1952
(Volume in Tons)

	Origin											
Destination	Calif.	Idaho	Wash.	Oregon	Ariz.	Utah	Nev.	Total Pacific Slope	Four Mountain States	Other States	Total U.S.	Percent of U.S.
Pacific Slope												
California	904	731	346	147	0	1,083	38	3,249	208	86	3,543	0.98%
Idaho	0	1,139	0	2,368	0	0	0	3,507	0	0	3,507	0.96
Washington	0	2,206	11,344	3,099	0	203	0	16,852	5,367	0	22,219	6.12
Oregon	0	1,095	5,447	0	0	50	0	6,592	2,366	0	8,958	2.46
Arizona	0	0	0	0	0	0	0	0	0	0	0	0.00
Utah	0	3,192	62	55	0	254	0	3,563	690	0	4,252	1.18
Nevada	0	0	0	0	0	0	34	34	0	0	34	0.01
Total	904	8,363	17,199	5,669	0	1,590	72	33,797	8,631	86	42,514	11.71
Four Mountain States	0	205	57	0	0	108	0	370	4,664	847	5,881	1.62
Other States	118	577	279	0	0	277	0	1,251	21,046	292,461	314,758	86.67
Total United States	1,022	9,145	17,535	5,669	0	1,975	72	35,418	34,341	293,394	363,153	100.00%
Percent of United States	0.28%	2.52%	4.83%	1.56%	0.00%	0.54%	0.02%	9.75%	9.46%	80.79%	100.00%	

Source: Interstate Commerce Commission, Carload Waybill Analyses, 1952. Statement No. 5143

Table A-14

ICC WAYBILL SAMPLE OF RAIL SHIPMENTS OF WHEAT FLOUR, 1952
(Volume in Tons)

	Origin											
Destination	Calif.	Idaho	Wash.	Ore.	Ariz.	Utah	Nev.	Total Pacific Slope	Four Mountain States	Other States	Total U. S.	Percent of U. S.
Pacific Slope												
California	1,398	241	110	1,176	0	934	0	3,859	210	181	4,250	4.86%
Idaho	34	0	0	0	0	23	0	57	32	0	89	0.11
Washington	80	0	511	347	0	46	0	984	85	0	1,069	1.22
Oregon	99	0	855	183	0	81	0	1,218	138	35	1,391	1.59
Arizona	104	0	0	0	0	0	0	104	156	0	260	0.30
Utah	0	0	0	0	0	72	0	72	30	0	102	0.11
Nevada	0	0	0	0	0	66	0	66	0	0	66	0.08
Total	1,715	241	1,476	1,706	0	1,222	0	6,360	651	216	7,227	8.27
Four Mountain States	0	150	0	0	0	87	0	237	100	111	448	0.51
Other States	0	420	0	135	0	40	0	595	1,521	77,742	79,858	91.22
Total United States	1,715	811	1,476	1,841	0	1,349	0	7,192	2,272	78,069	87,533	100.00%
Percent of United States	1.96%	0.93%	1.69%	2.10%	0.00%	1.54%	0.00%	8.22%	2.60%	89.18%	100.00%	

Source: Interstate Commerce Commission, Carload Waybill Analyses, 1952. Statement No. 5143

Table A-15

EXISTING IRRIGATION PROGRAM, SCHEDULE FOR 1959, AND ANTICIPATED ULTIMATE DEVELOPMENT
BUREAU OF RECLAMATION PROJECTS[1], SEVEN PACIFIC SLOPE STATES AND ELEVEN WESTERN STATES

States and Projects	Thousands of Acres-Irrigable Land: Existing Development June 30, 1952 New	Supplemental	Anticipated Development June 30, 1959 New	Supplemental	Ultimate Development New	Supplemental
California						
A. Completed Projects and Divisions[2]	139.1	1,274.4	425.2	1,580.6	704.2	2,022.9
B. Continuing Projects and Divisions-Total	69.9	958.1	356.0	1,264.3	635.0	1,706.6
All-American Canal[3]	60.6	425.0	74.8	425.0	86.1	425.0
Cachuma	—	—	12.5	14.4	12.5	14.4
Central Valley	9.3	533.1	212.7	808.8	465.4	1,181.1
Santa Maria	—	—	—	—	—	30.0
Solano	—	—	56.0	16.1	56.0	16.1
Washoe[4]	—	—	—	—	15.0	40.0
Idaho						
A. Completed Projects and Divisions[2]	481.6	983.7	560.5	1,633.7	786.1	1,636.7
B. Continuing Projects and Divisions-Total	82.2	378.2	161.1	1,028.2	386.7	1,031.2
Boise-Anderson Ranch	—	300.0	—	300.0	—	300.0
Boise-Payette	52.8	—	52.8	—	52.8	—
Cambridge Bench	—	—	—	—	—	2.4
Council	—	—	—	—	1.6	2.6
Lewiston Orchards	3.8	—	3.8	—	3.8	—
Michaud Flats	—	—	11.0	—	11.0	—
Minidoka-Gooding	20.5	78.2	20.5	78.2	20.5	78.2
Minidoka-North Side Pumping	5.1	—	69.5	—	69.5	—
Palisades	—	—	—	650.0	—	650.0
Rathdrum Prairie	—	—	3.5	—	35.5	—
Snake River-Mountain Home	—	—	—	—	192.0	—
Washington						
A. Completed Projects and Divisions[2]	289.6	191.2	778.6	198.2	1,317.5	198.2
B. Continuing Projects and Divisions-Total	159.8	—	648.8	7.0	1,187.7	7.0
Columbia Basin	87.8	—	556.3	—	1,095.2	—
Foster Creek	—	—	6.0	2.7	6.0	2.7
Yakima-Kennewick	—	—	14.5	4.3	14.5	4.3
Yakima-Roza	72.0	—	72.0	—	72.0	—
Oregon						
A. Completed Projects and Divisions[2]	214.6	210.4	241.9	256.8	246.4	291.3
B. Continuing Projects and Divisions-Total	134.5	173.8	161.8	219.2	166.3	253.7
Baker-Upper Division	—	—	—	20.0	—	20.0
Crooked River	—	—	10.2	9.9	10.2	9.9
Dalles	—	—	—	—	4.5	—
Deschutes-North Unit	50.0	49.2	50.0	49.2	50.0	49.2
Klamath[6]	84.5	124.6	90.4	131.2	90.4	165.7
Rogue River Basin-Talent Division	—	—	11.2	8.9	11.2	8.9
Arizona						
A. Completed Projects and Divisions[2]	322.8	97.1	390.5	110.6	395.4	755.7
B. Continuing Projects and Divisions-Total	20.1	1.7	87.8	15.2	92.7	660.3
Central Arizona[7]	—	—	—	—	—	638.0
Gila	20.1	1.7	87.8	15.2	92.7	22.3
Utah						
A. Completed Projects and Divisions[2]	40.1	295.1	56.1	326.1	242.6	561.5
B. Continuing Projects and Divisions-Total	—	46.6	16.0	77.6	202.5	313.0
Bear River[5]	—	—	—	—	116.2	72.8
Central Utah	—	—	—	—	28.6	131.8
Dixie	—	—	2.0	10.0	7.2	10.0
Gooseberry	—	—	—	—	—	17.4
Provo River	—	46.6	—	56.6	—	56.6
Weber Basin	—	—	14.0	11.0	50.5	24.4
Nevada						
A. Completed Projects and Divisions[2]	72.1	68.8	74.6	68.8	84.6	98.8
B. Continuing Projects and Divisions-Total	—	—	2.5	—	12.5	30.0
Fort Mohave	—	—	2.5	—	2.5	—
Humboldt	—	—	—	—	10.0	30.0
Total Pacific Slope						
A. Completed Projects and Divisions[2]	1,559.9	3,121.7	2,527.4	4,174.8	3,776.8	5,567.1
B. Continuing Projects and Divisions	466.5	1,558.4	1,434.0	2,611.5	2,683.4	4,003.8
Four Mountain States[8]						
A. Completed Projects and Divisions[2]	879.1	750.9[9]	1,048.0	1,325.8[9]	1,406.7	2,038.3[9]
B. Continuing Projects and Divisions	340.2	158.7	509.1	733.6	867.8	1,446.1
Eleven Western States						
A. Completed Projects and Divisions[2]	2,439.0	3,872.6	3,575.4	5,500.6	5,183.5	7,605.4
B. Continuing Projects and Divisions	806.7	1,717.1	1,943.1	3,345.1	3,551.2	5,449.9

1/ Data from the Annual Report of the Secretary of the Interior, Fiscal Year Ending June 30, 1952.
2/ All projects, divisions and portions thereof completed by December 31, 1951.
3/ California-Arizona.
4/ California-Nevada.
5/ Idaho-Wyoming.
6/ Oregon-California.
7/ Arizona-New Mexico.
8/ Colorado, Montana, New Mexico and Wyoming.
9/ Includes 35.7 percent of the North Platte Project supplementally irrigated land. This account was attributed to Wyoming on the basis of the proportion of fully irrigated land in the entire project which is located in that state.

Table A-16

RATES FOR HAULING MILK IN TANK TRUCKS IN OREGON AND WASHINGTON, 1953 1/

Distance Miles	Regular Rate 2/ Min. 26,500 Lbs. Cents/Cwt.	Contract Rate 2/ Min. 30,000 Lbs. Cents/Cwt.
20 or less	6.5	6.5
20-25	7.5	7.5
-30	8.5	8.5
-35	10.0	10.0
-40	11.0	11.0
-45	12.5	12.5
-50	14.0	14.0
-60	17.0	15.0
-70	20.0	16.5
-80	22.5	18.0
-90	25.5	19.5
-100	28.0	21.0
-110	31.0	22.0
-120	34.0	23.0
-130	36.5	24.0
-140	39.5	25.0
-150	42.5	26.0
-160	45.0	27.0
-170	48.0	
-180	51.0	
-190	53.5	
-200	56.5	
-220	62.0	
-240	67.5	
-260	73.5	
-280	79.0	
-300	84.5	
-320	90.0	
-340	96.0	
-360	101.5	
-380	107.0	
-400	113.0	
Each Additional 20 Miles or Fraction Thereof	add 7.0	

1/ Schedule A, Milky Way, Inc., Lynden, Washington. Rate in effect since 1946.

2/ Derived rate obtained from data furnished by milk handlers and carriers.

Table A-17

CHARGES FOR FARM PICKUP OF FLUID MILK AND CREAM IN BULK AND IN CANS, OREGON AND WASHINGTON, 1953

Distance Miles	Tank Pickup Cents/Cwt.	Can Pickup Cents/Cwt.
0-4	11	14
5-8	13	16
9-15	15	18
16-22	17	20
23-30	20	23

Source: Information supplied by milk handlers and carriers.

Table A-18

PRODUCTION AND INSHIPMENTS OF WHEAT AND
DOMESTIC OUTSHIPMENTS AND EXPORTS OF WHEAT AND WHEAT FLOUR
PACIFIC NORTHWEST
(Crop Years 1946-47 through 1952-53[1/]
Thousands of Bushels, Wheat Equivalent)

	1946-1947	1947-1948	1948-1949	1949-1950	1950-1951	1951-1952	1952-1953
Production of Wheat	113,865	96,862	115,735	93,755	102,900	115,040	123,391
Inshipments of Wheat[2/]	n.a.	8,165	17,567	16,567	18,900	35,900	26,300
Domestic Outshipments							
Wheat by Rail	11,631	4,598	2,689	2,318	1,980	2,419	1,703
by Water	1,739	2,716	2,892	3,572	6,568	7,473	8,446
Wheat Flour[2/] by Rail	9,480	6,722	3,458	1,212	967	761	497
by Water	419	1,352	685	37	63	116	109
Total Outshipments	23,269	15,388	9,724	7,139	9,578	10,769	10,755
Exports of Wheat and Wheat Flour							
To Europe	7,601	2,714	5,411	5,691	13,798	5,550	10,663
Asia	43,071	44,633	64,472	58,287	61,085	99,254	61,268
Latin America	3,826	2,069	3,737	3,497	7,821	13,480	9,681
Canada	45	2	17	1	6	6,815	8,652
Africa	0	317	0	0	1,090	333	16
Total Exports	54,543	49,735	73,637	67,476	83,800	125,432	90,280

1/ Year beginning July 1, except for domestic shipments of wheat flour, which are for the calendar year.

2/ Mostly from Montana.

Sources: Northwest Wheat Research Project, Pacific Northwest Wheat Market Summary; U. S. Department of Agriculture, Bureau of Agricultural Economics, Wheat and Flour Exports 1922-1949 from the Pacific Northwest (August 1950 and supplements for 1951, 1952, and 1953); Pacific Northwest Grain and Grain Products Association, Report Covering a Survey on the Matter of Rates and Movements of Grain and Grain Products within and from the Pacific Northwest to all Consuming Markets, September 18, 1952.

Table A-19

WHEAT PRODUCTION IN OREGON, WASHINGTON, AND NORTHERN IDAHO, AND WHEAT AND WHEAT FLOUR EXPORTS[1] FROM OREGON AND WASHINGTON CUSTOMS DISTRICTS, 1940-1951
(Thousands of Bushels)

Year	Wheat Production In Oregon, Washington, and Northern Idaho	Wheat and Wheat Flour Exports
1940	69.735	22,643
1941	93,117	7,042
1942	82,238	6,512
1943	78,901	5,467
1944	95,816	5,728
1945	93,509	43,638
1946	113,865	54,543
1947	96,238	49,735
1948	115,735	73,637
1949	91,625	67,476
1950	100,811	84,717
1951	113,445[2]	n.a.[3]

1/ Includes exports to all foreign destinations.
2/ Preliminary
3/ Not available.
Sources: Pacific Northwest Grain and Grain Products Association. Northwest Wheat Study of the Oregon Wheat Commission and Washington Department of Agriculture in Cooperation with U. S. Department of Agriculture. Federal Agricultural Statistican, Portland, Oregon. Grain Stocks Report, U. S. Department of Agriculture, Portland, Oregon

Table A-20

ICC WAYBILL SAMPLE OF RAIL SHIPMENTS OF FROZEN VEGETABLES, 1952
(Volume in Tons)

	Origin							
Destination	Calif.	Idaho	Oregon	Wash.	Total Pacific Slope	Four Mountain States	Other States	Total U. S.
Pacific Slope								
California	30	0	55	88	173	0	0	173
Idaho	0	0	0	0	0	0	0	0
Oregon	23	0	49	25	97	0	0	97
Washington	53	0	32	0	85	0	0	85
Total	106	0	136	113	355	0	0	355
Four Mountain States	25	34	64	0	123	0	0	123
Other States	831	168	287	470	1,756	0	293	2,049
Total United States	962	202	487	583	2,234	0	293	2,527

Source: Interstate Commerce Commission, Carload Waybill Analyses, 1952.

Table A-21

SELECTED TRUCK RATES ON
FROZEN FRUITS AND VEGETABLES

From:	To:	
Seattle, Washington	Cheyenne, Wyoming	$1.91 - 30M
	Denver, Colorado	1.91 - 30M
	Colorado Springs, Colorado	2.14 - 30M
	Pueblo, Colorado	2.14 - 30M
Dayton, Grandview, Kennewick, Prosser, Sunnyside, Waitsburg, Walla Walla, Wenatchee, Yakima, Zillah, Washington; Milton Freewater, Pendleton, Weston, Oregon; Lewiston, Idaho	Denver, Colorado	$2.14 - 30M
Portland, Oregon; Kent, Tacoma, Sumner, Puyallup and Auburn, Washington	Denver, Colorado	$2.14 - 30M

From:	To:	
Albany, Oregon	Chicago, Illinois	$2.65 - 28M
Ellensburg, Washington	Chicago, Illinois	2.65 - 28M
Grandview, Washington	Chicago, Illinois	2.65 - 28M
Lewiston, Idaho	Chicago, Illinois	2.65 - 28M
Pendleton, Oregon	Chicago, Illinois	2.65 - 28M
Portland, Oregon	Chicago, Illinois	3.28 - 28M
Salem, Oregon	Chicago, Illinois	3.28 - 28M
Seattle, Washington	Chicago, Illinois	2.65 - 28M
Tacoma, Washington	Chicago, Illinois	2.65 - 28M
Walla Walla, Washington	Chicago, Illinois	2.65 - 28M
Wenatchee, Washington	Chicago, Illinois	2.65 - 28M
Yakima, Washington	Chicago, Illinois	2.65 - 28M

From:	To:	
Albany, Oregon	Minneapolis, Minnesota	$2.42 - 28M
Ellensburg, Washington	Minneapolis, Minnesota	2.42 - 28M
Grandview, Washington	Minneapolis, Minnesota	2.42 - 28M
Lewiston, Idaho	Minneapolis, Minnesota	2.42 - 28M
Pendleton, Oregon	Minneapolis, Minnesota	2.42 - 28M
Portland, Oregon	Minneapolis, Minnesota	2.76 - 28M
Salem, Oregon	Minneapolis, Minnesota	2.76 - 28M
Seattle, Washington	Minneapolis, Minnesota	2.42 - 28M
Tacoma, Washington	Minneapolis, Minnesota	2.42 - 28M
Walla Walla, Washington	Minneapolis, Minnesota	2.42 - 28M
Wenatchee, Washington	Minneapolis, Minnesota	2.42 - 28M
Yakima, Washington	Minneapolis, Minnesota	2.42 - 28M

From:	To:	
Portland, Oregon	Boise, Idaho	$1.36 - 30M
	Salt Lake City, Utah	1.36 - 30M
	Butte, Montana	2.14 - 15M
Seattle, Washington	Boise, Idaho	1.36 - 30M
	Salt Lake City, Utah	1.36 - 30M
	Butte, Montana	2.14 - 15M
Kennewick, Washington	Seattle-Tacoma, Washington	.77 - 20M
	Burlington, Washington	.96 - 30M
Waitsburg, Washington	Seattle-Tacoma, Washington	.87 - 30M
Ellensburg, Washington	Seattle-Tacoma, Washington	.66 - 30M
	Waitsburg, Washington	1.11 - 20M
		.87 - 30M
	Pasco Group (Kennewick)	.77 - 20M

Between:	And:	
Grandview, Washington	Pasco, Washington	$ .43 - 20M

Table A-21 (Continued)

From:	To:	
Milton Freewater, Oregon	Portland, Oregon	$ .95 - 20M
Yakima, Washington	Portland, Oregon	.77 - 20M
Walla Walla, washington	Portland, Oregon	.95 - 20M
Spokane, Washington	Portland, Oregon	.95 - 20M
Portland, Oregon	San Francisco, California	1.11 - 35M
Seattle, Washington	San Francisco, California	1.32 - 35M
Monroe, Washington	San Francisco, California	1.51 - 35M
Mt. Vernon, Washington	San Francisco, California	1.51 - 35M
Bellingham, Washington	San Francisco, California	1.51 - 35M
Yakima, Washington	San Francisco, California	1.30 - 35M
Walla Walla, Washington	San Francisco, California	1.30 - 35M
Lewiston, Idaho	San Francisco, California	1.75 - 30M
Wenatchee, Washington	San Francisco, California	1.50 - 20M
Portland, Oregon	San Jose, California	1.47 - 20M
Seattle, Washington	San Jose, California	1.50 - 30M
Bellingham, Washington	San Jose, California	1.72 - 20M
Yakima, Washington	San Jose, California	1.50 - 30M
Wenatchee, Washington	San Jose, California	1.50 - 30M
Portland, Oregon	Los Angeles, California	1.37 - 35M
Milton-Freewater, Oregon	Los Angeles, California	1.58 - 35M
Seattle, Washington	Los Angeles, California	1.46 - 35M
Bellingham, Washington	Los Angeles, California	1.55 - 35M
Pasco, Washington	Los Angeles, California	1.58 - 35M
Wenatchee, Washington	Los Angeles, California	1.50 - 30M
Portland, Oregon	San Diego, California	1.72 - 30M
Milton-Freewater, Oregon	San Diego, California	2.08 - 30M
Bellingham, Washington	San Diego, California	2.01 - 30M
Seattle, Washington	San Diego, California	1.74 - 30M
Wenatchee, Washington	San Diego, California	1.74 - 30M
Seattle, Washington	Phoenix, Arizona	4.03 - 30M
Portland, Oregon	Phoenix, Arizona	3.91 - 30M
Spokane, Washington	Phoenix, Arizona	4.31 - 30M

Source: Consolidated Freightways, Inc., Portland, Oregon.

Appendix B

BUREAU OF RECLAMATION IRRIGATION PROJECTS

A. The Central Valley Project of California

The Central Valley is a unique agricultural region, noted for the intensity and diversity of its agricultural output. The economy of the Valley is predominantly agricultural, based primarily on local and largely independent irrigation works constructed by private agencies and local public agencies.

The expansion of agricultural production in the Central Valley in the immediate years ahead would appear to be subject to the extension of irrigation. It is estimated that more than 4.5 million acres are now irrigated. About forty percent of the irrigated land is covered from underground water supplies. Since 1880, an overexpansion has occurred in areas primarily dependent on ground water sources, resulting in a declining water table in the San Joaquin Valley. A feature of the water situation in the Central Valley is the imbalance of available water to potential irrigation needs in different parts of the Valley. This will necessitate a transfer of water from the Sacramento Basin to the San Joaquin Basin in the south.

Estimates of net arable acreage in the various basins of the Central Valley have been made by the Bureau of Reclamation and the California Water Resources Board. These indicate considerable possibilities in expanding irrigation. The estimates include land needing supplemental water supplies above those required at the time the projects were built, due to the increasing intensity of agriculture.

Table B-1

ESTIMATES OF TOTAL[1/] NET IRRIGABLE ACREAGE, CENTRAL VALLEY, CALIFORNIA
(Thousands of Acres)

Geographical Division	Bureau of Reclamation	State of California
Sacramento Valley	1,600	2,386
Sacramento Delta	360	392
American River & Lower San Joaquin	1,360	1,930
Upper San Joaquin, East Side	2,200	2,856
Upper San Joaquin, West Side	710	792
Foothills and Mountain Valleys	350	1,614
Total	6,580	9,970

1/ Includes land now irrigated.

Source: The Report of the President's Water Resources Policy Commission, Vol. II, p. 90.

1. Programmed Expansion of Irrigation

The bulk of the extension of irrigation proposed for the Central Valley is planned by the Bureau of Reclamation. Ultimately 465,000 acres of new irrigation and 1.18 million acres of supplemental irrigation will be developed in the Central Valley under its auspices starting from a base of 93,000 acres of new irrigation and 533,000 acres of supplemental irrigation in 1952 (Table B-2). Increments of 3,000 acres of new irrigation will be added through 1957. About 38,000 acres will be added in 1958, and 150,000 acres in 1959, leaving a balance of 253,000 acres to be completed ultimately. Supplemental irrigation will be added in larger increments and all except 372,000 acres of the program as presently planned will be completed by 1959.

The irrigation program of the Bureau of Reclamation is divided into three divisions--the Sacramento Valley Unit, the San Joaquin Valley District, and the Delta-Mendota Canal Service Area. Of these, the Sacramento Canals Unit is the only one authorized.1/ The Sacramento Canals Unit proposes the addition of 205,000 acres of new irrigation situated north of the city of Sacramento. Ultimately, the San Joaquin project will add more new irrigation than the Sacramento Canals Unit--237,000 acres. The bulk of the new acreage is to be added in the West Side Unit of the San Joaquin Valley and most of the remainder will be added in the East Side Unit. The extension of supplemental irrigation in the San Joaquin Valley will approximately equal the new acreage to be irrigated. Most of the supplemental water will be brought to lands in the central part of the San Joaquin Valley. Comparatively speaking, the Delta-Mendota Canal Service Unit is small, adding only about 32,000 acres of new irrigation and about 22,000 acres of supplemental irrigation.

2. Land Utilization

About half of the livestock produced in California originates in the Central Valley. Livestock is the major source of income on 30 percent of the farms in the Valley. Half of the acreage is devoted to pasture and forage crops. Alfalfa accounts for nearly 14 percent and other hay crops for an additional 18 percent of the acreage (Table B-3). The major field crops are dry beans, barley, alfalfa, and sugar beets, in all accounting for about 9 percent of the acreage. About 11 percent of the acreage is in rice and about 7 percent in cotton. Truck and orchard crops are of about equal importance, accounting for nearly 10 percent of the acreage. The acreage devoted to citrus is very small but the production of wine grapes is very important.

1/ Submitted to the Congress by the Secretary of the Interior as a part of the Trinity River Project, January 1953.

Table B-2

PROGRAMMED EXTENSION OF IRRIGATION,
CENTRAL VALLEY PROJECT, CALIFORNIA
1952-1959 (Fiscal Year Ending June 3)
(Acres)

Year	Sacramento Canals Unit		San Joaquin Valley District		Delta-Mendota Canal Service Area		Central Valley Project	
	New	Supplemental	New	Supplemental	New	Supplemental	New	Supplemental
1952	-	-	9,300	532,100	9,300	1,050	18,600	533,150
1953	-	-	3,000	9,100	3,000	6,172	6,000	15,272
1954	-	-	2,850	23,000	2,850	1,250	5,700	24,250
1955	-	-	4,100	37,000	4,100	1,400	8,200	38,400
1956	-	-	3,200	114,000	3,200	1,300	6,400	115,300
1957	-	-	2,600	38,000	2,600	2,500	5,200	40,500
1958	35,300	-	37,800	23,000	2,500	3,500	75,600	26,500
1959	147,500	-	149,900	8,800	2,400	3,500	299,800	12,300
Balance	22,600	-	24,669	-	2,069	1,300	49,338	1,300

Source: L. B. Christiansen, Bureau of Reclamation, U. S. Department of the Interior, Region 2, Sacramento, California.

Table B-3

PRESENT CROP PATTERN OF IRRIGATED ACREAGE, CENTRAL VALLEY, CALIFORNIA[1]

	Sacramento Valley		San Joaquin Valley		Sacramento San Joaquin Delta		Central Valley	
	Acres	Percent	Acres	Percent	Acres	Percent	Acres	Percent
Hay and Pasture								
Alfalfa	79,400	10.4	258,100	16.5	28,800	7.7	366,300	13.6
Pasture	152,200	19.9	300,000	19.1	23,700	6.4	475,900	17.6
Hay and Grain	10,700	1.4	360,100	23.0	118,900	32.0	489,700	18.1
Subtotal	242,300	31.7	918,200	58.6	171,400	46.1	1,331,900	49.3
Field Crops								
Rice	268,700	35.2	24,900	1.6	700	0.2	294,300	10.9
Cotton	--	--	186,200	11.9	--	--	186,200	6.9
Other Field Crops[2]	80,100	10.5	101,600	6.5	66,100	17.8	247,800	9.2
Subtotal	348,800	45.7	312,700	20.0	66,800	18.0	728,300	27.0
Truck Crops	35,200	4.6	89,300	5.7	128,100	34.4	252,600	9.3
Tree and Vine Crops								
Orchard	127,800	16.8	123,900	7.9	5,500	1.5	257,200	9.5
Citrus Orchard	1,000	0.1	1,500	0.1	--	--	2,500	0.1
Vineyard	8,500	1.1	120,700	7.7	--	--	129,200	4.8
Subtotal	137,300	18.0	246,100	15.7	5,500	1.5	388,900	14.4
Total	763,600	100.0	1,566,300	100.0	371,800	100.0	2,701,700	100.0

1/ Based on surveys of the Bureau of Reclamation 1946-50.
2/ Sugar beets, milo, beans, and grains.

Source: From unpublished report prepared by W. E. Taggart and John Morgan, Bureau of Reclamation, Region 2, Sacramento, California.

Considerable differences in land utilization are apparent in the three main sections of the Central Valley. Utilization for pasture and forage is high in all areas. Most of the rice is grown in the Sacramento Valley and the cotton is grown in the San Joaquin Valley. Other field crops are of greater importance in the Sacramento and the Delta areas. Orchard crops are also more important in the Sacramento Valley, but vineyards are mostly concentrated in the San Joaquin Valley.

The Bureau of Reclamation has made a study of the prospective cropping pattern of full development in the Sacramento Canals Unit which is expected to add another 205,000 acres of new irrigation (Table B-4). Forage production is expected to be of greater importance in the new areas of the Sacramento Division, accounting for about 45 percent of the total acreage compared to 32 percent of the acreage utilized under the present cropping pattern. Hence, livestock production may be an important enterprise. Fruits and nuts will use about the same proportions of the land. Field and truck crop acreages will decline from 50 percent to about 35 percent and will be replaced mostly by forage crops.

B. <u>The Snake River Basin, Idaho</u>

Three projects are authorized for development in the middle and upper Snake River Basin: the Northside Pumping Division of the Minidoka Project, the Palisades Project, and the power plant to be installed at American Falls Dam.

1. <u>The Palisades Project</u>

The Palisades Project is now under construction and is scheduled to provide initial storage in October 1956. This project is primarily intended to provide an assured water supply to lands now irrigated in years of subnormal precipitation. About 650,000 acres of presently irrigated farm lands will receive supplemental water supplies from the Palisades Project. But it is not expected that agricultural production on these lands will increase over what has occurred during the last few years. An additional 50,000 acres will be provided with a new water supply from Palisades and American Falls. These include 14,000 acres of the Minidoka Northside Pumping Division, about 30,000 acres of the Michaud Flats Project (south of the American Falls Reservoir), and about 6,000 acres to be delivered to individual applicants scattered over the entire upper Snake River Basin.

2. <u>The Minidoka Project, Northside Pumping Division</u>

In the present Minidoka Project there are about 107,000 acres of irrigated land, of which 62,000 acres are supplied by gravity diversion and 44,000 acres by pumping. The authorized

Table B-4

CROP PATTERN EXPECTED AT FULL DEVELOPMENT, SACRAMENTO CANALS UNIT, SACRAMENTO DIVISION, CENTRAL VALLEY PROJECT, CALIFORNIA

	Sacramento Canals Unit	
	Acres	Percent
Irrigated Crops		
General 1/	38,600	18.8
Fruits and Nuts 2/	32,500	15.8
Forage 3/	100,200	48.7
Subtotal	171,000	83.3
Nonirrigated Crops 4/	34,400	16.7
Total	205,400	100.0

1/ Sugar beets, milo and beans.
2/ Almonds, walnuts, olives, and prunes.
3/ Alfalfa, ladino clover, and sudan grass.
4/ Dry-farmed to grains or followed due to rotational practices.

Source: Sacramento Canals Unit, Sacramento River Division, Central Valley Project, California. Report submitted to Commissioner, Bureau of Reclamation, December 1952, Table 16, p. 128.

Northside Pumping Division of the Minidoka Project contemplates development of an additional 78,000 irrigable acres by pumping from the Snake River and from ground water. The present schedule calls for 10,000 additional acres in 1954, 1955, and 1956. It is expected that 24,000 acres will be irrigated in 1957, of which about 10,000 will be based upon ground water sources and the remainder will complete the surface water development. The balance is scheduled for completion in 1958.

The Northside Pumping Division is located in Minidoka and Jerome counties, comprising a relatively compact area, which is long and narrow. The area lies north and west of the town of Rupert in the prosperous farming community of the original Minidoka Project. To the west are the irrigated farm lands of the Twin Falls Northside Development and the Minidoka-Gooding Project.

The bulk of the projected development in the Northside Pumping Division is located in Minidoka County. Scheduled development will more than double the irrigated acreage in the county. In Jerome County, where the irrigated acreage was reported at 96,000 acres, the impact of the project will be much less important.

Existing towns of the developed area to the south will provide the basic services required in the future. Processing and warehousing facilities likely to be needed by settlers are already established at nearby centers. It is expected that these services will be adequate, at least during the earlier stages of development.[1/]

3. Land Utilization

Studies of the Bureau of Reclamation of the anticipated distribution of crops on the Northside Pumping Division indicate considerable similarity to the pattern of land utilization on existing projects in the two counties. Barley and wheat are expected to be of about equal importance, utilizing about 13 percent of the total acreage. Potatoes will require another 13 percent. Sugar beets and dry beans will contribute equally to a total of 19 percent of the total acreage. Peas will add 2 percent; and seed crops, mainly red clover, will account for another 5 percent.

The importance of livestock in the project after full development is indicated by the estimate that about a third

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1/ United States Department of the Interior. Bureau of Reclamation, Region 1, Minidoka Project, Northside Pumping Division, Idaho, Project Planning Report No. 1-5.53.1-1. Boise, Idaho, (April 1949) p. 112.

of the total acreage will be devoted to alfalfa and red clover hay. Together with pasture and hay crops, including seeds, these crops are expected to utilize approximately half of the acreage in the Northside Pumping Division (Table B-5).

4. Private Ground Water Development--Snake River Basin

It may be well to note that prospects of substantial private development of irrigation through ground water supplies may overshadow the extent of the federal program in this area. It is estimated that 102,000 acres have been developed in this manner in the last three years.1/ Further, it is believed that if relatively high agricultural prices continue to prevail, private development of ground water may expand for several more years. There are some differences of opinion concerning the total potential ground water development in the Snake River Basin. An estimate of about 500,000 acres appears to be a reasonable compromise of these conflicting opinions. About 140,000 acres of this total have already been developed, leaving a balance of 360,000 acres. The rate of development is not expected to be comparable to that prevailing in the last three years. It may take twenty to thirty years, depending upon economic conditions, until the maximum potential development is achieved. The counties located in the middle and upper Snake River Basin will continue to be the center of activity in the development of irrigation based upon ground water resources. These include Minidoka, Twin Falls, Cassia, Bingham, Jefferson, and Ottema.

The Mountain Home Division, Payette Unit, of the Snake River Project, is potentially very important, but is less pertinent to the present study. This project is not yet authorized, but it will be under construction during the period prior to 1970. First delivery of water to the 192,000 acres of this project probably will not occur until after 1970.2/

C. Lower Colorado River Projects

Major existing irrigation developments in the lower Colorado River Basin are the Salt River Project, centered at Phoenix, and the Valley Division of the Yuma Project at Yuma, both in Arizona; and the Imperial District in the Coachella Valley Development located in California.

1/ Information furnished by J. Karl Lee, Chief Economist, Bureau of Reclamation, Boise, Idaho.

2/ Estimated potential electric power requirements of the Snake River Basin, Bonneville Power Administration, United States Department of the Interior, January 1952.

Table B-5

ANTICIPATED LAND UTILIZATION BY CROP, NORTHSIDE PUMPING UNIT, MINIDOKA PROJECT, IDAHO

	Acres	Percent
Forage Crops		
Alfalfa	22,860	31.3
Red Clover	2,190	3.0
Pasture	8,795	12.1
Subtotal	33,845	46.4
Seed Crops		
Beans	1,265	1.7
Red Clover	2,190	3.0
Subtotal	3,455	4.7
Small Grains		
Barley	4,410	6.1
Wheat	5,040	6.9
Subtotal	9,450	13.0
Field Crops		
Potatoes	9,520	13.0
Sugar Beets	6,900	9.5
Dry Beans	7,130	9.8
Peas	1,265	1.7
Subtotal	24,815	34.0
Miscellaneous Crops	2,140	2.9
Duplicated Acreage	715	1.0
Net Irrigable Acreage	72,990	100.0
Farmstead, Ditches, etc.	4,660	-
Irrigable Acreage	77,650	-
Roads, Rights-of-Way, etc.	3,230	-
Arable Acreage	80,880	-

Source: U. S. Department of the Interior, Bureau of Reclamation, Region 1. Minidoka Project, Northside Pumping Division, Idaho, Project Planning Report No. 1-5. 53. 1-1. Boise, Idaho (April 1949).

The Salt River Project includes about 240,000 acres of land. In addition, another 97,000 acres comprise Western Act lands also irrigated from the project system. Adjacent private development, largely based upon ground water sources and pumping, add another 100,000 acres to the whole development around Phoenix. The proposed Central Arizona Project would bring supplemental water to some 640,000 acres of farm lands in the south central part of the state to relieve the present water shortage. It would not provide for any new irrigation and no additional lands would be opened for settlement. Development has not been possible due to the conflicting claims of the states of Arizona and California to Colorado River water.

1. <u>All-American Canal--Coachella Division</u>

The Imperial Irrigation District of southeastern California on the Mexican border comprises approximately 400,000 acres irrigated principally from the All-American Canal. Another branch of the All-American Canal extends northwest, past the Salton Sea, to provide irrigation for the Coachella Valley, located between the Salton Sea and the town of Indio.

An extension of irrigation is authorized by the Act of July 30,1947, on the Gila Project in Arizona and the Coachella Division of the All-American Canal System in California. On the Coachella Division, the program called for irrigating 74,800 acres between 1951 and 1954 (Table B-6). Of the 60,600 acres developed in 1952, water was delivered to 30,000 acres. In 1953 and 1954, an additional 9,600 acres and 4,600 acres, respectively, are planned for development to complete the project. That is, most of the project is already developed and a minor portion remains to be done. The economy of the area is based almost entirely upon agricultural production.

At the present time, only about a third of the irrigable acreage in the Valley is in production. The principal crops in the Coachella Valley are dates, grapes, citrus, and winter vegetables, although cotton and alfalfa are also important. The probable crop pattern under full development is still a question, but there is reason to believe that a pattern rather similar to the present one is going to prevail (Table B-7). Quite possibly the larger portion of the acreage, amounting to about 60 percent, is going to be devoted to tree, vine, and other specialty crops. The remainder will be planted to general field crops, such as cotton and alfalfa. There is the prospect that the livestock industry, in the form of dairying, pasturing, and dry-lot feeding, may become more important as the production of alfalfa and other forage crops increases.

Table B-6

ACREAGE UNDER DISTRIBUTION SYSTEM, JUNE 30, 1952
AND PROGRAMMED EXTENSIONS OF GILA PROJECT AND ALL-AMERICAN CANAL SYSTEM

	Gila Project 1/			Coachella Division All-American Canal 2/		
Fiscal Year	New	Supplemental	Total	New	Supplemental	Total
To June 30, 1952	20,106	1,687	21,793	60,600		60,600
1953	11,750	9,887	21,637	9,600		9,600
1954	17,650	1,650	19,300	4,600		4,600
1955	29,300	2,000	31,300	--		--
1956	--	--	--	--		--
1957	9,000	--	9,000	--		--
Total	87,806	15,224	103,030	74,800	--	74,800

1/ Does not include 4,894 acres deferred indefinitely and 7,076 of supplemental development where existing water supply is considered adequate by landowners. Yuma Mesa and Wellton-Mohawk Divisions.

2/ Acreage of land receiving water for the first time and that receiving a substitute supply not segregated.

Source : U. S. Department of the Interior, Bureau of Reclamation, Region 3, Boulder City, Nevada.

Table B-7

PATTERN OF LAND UTILIZATION EXPECTED WITH FULL DEVELOPMENT
COACHELLA VALLEY, ALL-AMERICAN CANAL SYSTEM, CALIFORNIA

Crop	Acres	Percent
Hay and Pasture		
Alfalfa	23,000	30.7
Permanent Pasture	3,000	4.0
Subtotal	26,000	34.7
Field Crops		
Cereal Grains 1/	2,000	2.7
Other Crops 2/	3,000	4.0
Subtotal	5,000	6.7
Truck Crops		
Sweet Corn	4,000	5.3
Onions	1,500	2.0
Green Beans	1,500	2.0
Tomatoes	1,000	1.4
Other Vegetables 3/	4,000	5.3
Subtotal	12,000	16.0
Tree and Vine Crops 4/		
Dates	12,000	16.0
Citrus Fruit	8,000	10.6
Grapes	12,000	16.0
Subtotal	32,000	42.6
Total 5/	75,000	100.0

1/ Includes principally barley, wheat, and oats. It is possible that a total of at least 4,000 or 5,000 acres will be in these crops annually, including acreages used as a nurse crop for young alfalfa.
2/ Flax, cotton, sugar beets, and other crops in varying amounts, depending on cost and price conditions.
3/ Carrots, cantaloupes, peas, sweet potatoes, spinach, peppers, squash, eggplant, watermellons, okra, cucumbers, celery, and others.
4/ Tree crops will probably include considerable acreages of tangerines and grapefruit and small acreages of other citrus fruit, figs, and pecans.
5/ No allowance has been made for double cropping in computing crop acreage. Annually, 2,000 or 3,000 acres of sorghum may be grown and 6,000 to 7,000 acres of vegetables may be double cropped, bringing the total crop acreage to 85,000 acres in some years.

Source: U. S. Department of the Interior, Bureau of Reclamation, Region 3, Boulder City, Nevada.

2. Gila Project—Wellton-Mohawk Division

The Gila Project in southwestern Arizona consists of the Yuma-Mesa and the Wellton-Mohawk Divisions. The Yuma-Mesa Division includes 40,000 acres of irrigable land situated to the south and east of Yuma. The Wellton-Mohawk Division includes 75,000 acres of irrigable land, starting approximately 50 miles east of Yuma and extending on both sides of the Gila River for about 40 miles. Under the present program, irrigation is to be provided for 87,800 acres of new lands, and supplemental irrigation will be provided for 15,200 acres. Of this total, nearly 4,900 acres are deferred indefinitely. Arrangements have not been initiated for delivering water to 7,100 acres in the south Gila Valley now supplied by pumping. The entire development, with the exception of 9,000 acres of new irrigation, will be completed in the year 1955. The last addition will be made in 1957. About 12,000 acres will be added in 1953, nearly 18,000 in 1954, and over 29,000 in 1955.

In 1949, Yuma County, Arizona, had a total cropland of about 106,000 acres, of which a little over 92,000 were irrigated. The single major irrigation area in that county was the Yuma Project. It consisted of about 65,000 acres, of which about 15,000 are included in the Reservation Division on the California side of the Colorado, and about 50,000 in the Valley Division in Arizona. In the Valley Division of the Yuma Project the major crops are flax seed, alfalfa hay and seed, cantaloupe and watermelon, lettuce, carrots and other vegetables, sugar beets, sorghum, small grains, pasture crops, and some citrus, as well as dates and pecans.

The Bureau of Reclamation has studied the prospective land utilization pattern on the Wellton-Mohawk Division of the Gila Project. It is estimated that forage will occupy about 36 percent of the project acreage (Table B-8). Field crops are expected to require a large acreage, 43 percent, with half in small grains and a quarter in flax, the rest in sorghum and cotton. Truck crops will be quite important, utilizing 21 percent of the acreage, and lettuce and cantaloupes are expected to be the major crops. Fruits and vine crops are likely to be of neglibible importance.

Table B-8

PATTERN OF LAND UTILIZATION EXPECTED WITH FULL DEVELOPMENT
WELLTON-MOHAWK DIVISION, GILA PROJECT, ARIZONA

Crop	Acres	Percent
Hay and Pasture		
Alfalfa 1/	19,000	27.6
Bermuda Grass	3,600	5.2
Pasture 2/	2,000	2.9
Subtotal	24,600	35.7
Field Crops		
Small Grains 3/	14,000	20.3
Sorghum 4/	5,000	7.3
Flax	7,000	10.2
Cotton	3,600	5.2
Subtotal	29,600	43.0
Truck Crops		
Lettuce	6,000	8.7
Cantaloupe 5/	4,000	5.8
Carrots	1,000	1.5
Watermelons 6/	1,500	2.2
Other Vegetables 7/	1,900	2.8
Subtotal	14,400	21.0
Tree and Vine Crops	200	0.3
Total Acres Cropped	68,800	100.0
Less Double Cropped	8,200	
Net Acres in Cultivation	60,600	

1/ It is assumed that all of the alfalfa acreage will be harvested for hay at least during a portion of the season. Of the 19,000 acres, 11,000 will also be harvested for seed, and 15,000 acres utilized for pasture.
2/ In addition, supplemental pasturage will be afforded from other crops.
3/ Small grains include barley, oats, and wheat.
4/ Assumes 3,800 acres grain sorghum double-cropped after other grains and flax.
5/ Assumes 25% grown alone; 75% grown after lettuce and carrots.
6/ Assumes 70% grown alone; 30% grown after lettuce and carrots.
7/ Includes such truck crops as tomatoes, peas, cabbage, cucumbers, honeydews, broccoli, cauliflower, celery, and others; assumes 50% double cropping.

Source: U. S. Department of Interior, Bureau of Reclamation, Region 3, Boulder City, Nevada.

BIBLIOGRAPHY

Abel, Harold, and Dee A. Broadbent. Trade in Western Livestock at Auctions; I. Development and Relative Importance of Operations. Utah Agricultural Experiment Station, Bulletin 352.

Alcorn, G. B., and E. C. Voorhies. People and Livestock in the West, Past, Present, Future. University of California Agricultural Extension Service.

Association of American Railroads, Bureau of Railway Economics, "Railway Mileage by States."

Baum, E. L. and others. Comparison of Costs of Receiving Milk in Cans and Tank Truck. Washington Agricultural Experiment Station, unpublished manuscript (December 1953).

Baum, E. L., and I. L. Corbridge. An Economic Study of Dairy Products Consumption, Seattle, Washington. Washington Agricultural Experiment Stations, Institute of Agricultural Sciences, State College of Washington, Technical Bulletin No. 8, (January 1953).

Baum, E. L., and C. M. Elkinton. A Comparative Analysis of Milk, Ice Cream, and Cottage Cheese Consumption in Seattle, Spokane, and Yakima, Washington, April and June 1951. Washington Agricultural Experiment Stations, Institute of Agricultural Sciences, State College of Washington.

Baum, E. L., and D. E. Pauls. A Comparative Analysis of Costs of Farm Collection of Milk by Can and Tank in Western Washington, 1952. Washington State College Agricultural Experiment Station, Technical Bulletin No. 10 (May 1953).

Bentson, M. S., and R. E. Struthers. Accomplishments of Irrigation, Weld County, Colorado, South Platte River District. U. S. Department of Interior, Bureau of Reclamation, Denver, Colorado (February 1952).

Bredo, William, and A. Rojko. Prices and Milksheds of Northeastern Markets, Northeast Original Publications, No. 9, University of Massachusetts Agricultural Experiment Station, Amherst, Massachusetts (August 1952).

Brough, O. L., et al. Estimated Fuel Requirements for the Potential Processing of Agricultural Products of the Columbia Basin Irrigation Project; A Report to Trans-Northwest Gas, Inc. Washington State College, Pullman, Washington (1951).

California Crop and Livestock Reporting Service. California Annual Livestock Report, Summary for 1952 (May 1, 1953).

California Public Utilities Commission. Report on the Cost of Transporting Fresh Fruits and Vegetables by Motor Vehicle Equipment within California, Excluding Movements to Canneries and Processing Plants. Los Angeles, California, Case No. 4808 (September 1952).

Canfield, R. S., and E. L. Baum. Inland Empire Dairy Association. State College of Washington.

Church, Donald E. Effect of Increases in Freight Rates on Agricultural Products. U. S. Department of Agriculture, Washington, D. C., Circular No. 847 (April 1950).

Clarke, D. A., Jr., and J. B. Hassler. Pricing Fat and Skim Components of Milk. California University Agricultural Experiment Station, Bulletin 737. (August 1953).

Clawson, Marion, and Wendell Calhoun. Longterm Outlook for Western Agriculture: General Trends in Agricultural Land Use, Production, and Demand. U. S. Department Agriculture, U. S. Department of Interior. (June 1946).

Cowden, Joseph M., and Harry C. Trelogan. Flexibility of Operation in Dairy Manufacturing Plants. U. S. Department of Agriculture. Washington, D. C., Circular No. 799 (September 1948).

Daggett, Stuart, and John P. Carter. The Structure of Transcontinental Railroad Rates. University of California Press (1947).

Daly, Rex F. Appraisal of the Long Run Prospects for Agriculture. U. S. Department of Agriculture, Bureau of Agricultural Economics, unpublished study (1951).

_____. Some Considerations in Appraising the Long-Run Prospects for Agriculture. U. S. Department of Agriculture, Bureau of Agricultural Economics. Washington, D. C., unpublished report (1951).

Dreesen, W. H. Transportation Rates on Livestock and Meat Products in Western States. Oregon State College Agricultural Experiment Station, Corvallis. Station Bulletin 496 (March 1951).

Bureau of Reclamation. Economics Branch. Indications of Business and Industrial Development That Will Result from the Irrigation of the Columbia Basin Project. Ephrata, Washington (January 1953).

Emerson, H. C.. Shipping Hard Frozen Foods by Rail and Truck. Refrigeration Engineering LIX (1951).

Federal Cooperative Extension Service, Oregon State College, Corvallis. Livestock: An Appraisal of the Problems and A Statement of Recommendations. Oregon Agriculture 17 (August 1952).

Federal Cooperative Extension Service, Oregon State College, Corvallis, Oregon's Dairy Industry, 1925-1953. Extension Bulletin 741 (August 1953).

Federal Reserve Bank of San Francisco. Cattle Feeding and Its Place in Twelfth District Agriculture. Supplement to Monthly Review (January 1953).

Federal-State Market News Service. Total Receipts of Butter and Cheese at Los Angeles. Annual Reports, 1948 Though 1952, Los Angeles, California.

_____. Total Receipts of Butter and Cheese at San Francisco. Annual Reports, 1948 Though 1952, San Francisco, California.

Federal Works Agency. Public Roads Administration. Highway Statistics, 1947.

_____. Highway Statistics, Summary to 1945.

Fluke, M. U. S. Department of Agriculture. Agricultural Marketing Service, Porland, Oregon, December 22, 1953.

Fuhriman, Walter W. Farm Organization and Income on Irrigated Farms in 1944, Vale-Owyhee Project, Oregon State College, U. S. Department of Interior. Bureau of Reclamation. U. S. Department of Agriculture. Bureau of Agricultural Economics. Washington, D. C. (January 1947).

Guthrie, J. A., et al. Markets and New Hands, Columbia Basin Joint Investigations. Bureau of Reclamation (June 1942).

Hansen, Carl J. Marketing Northwestern Potatoes. U. S. Department of Agriculture, Pruduction and Marketing Administration, Portland, Oregon (June 1953).

Harrington, A. H. and Wendell Calhoun. The Dairy Balance of the Pacific Slope. The State College of Washington and U. S. Department of Agriculture, Bureau of Agricultural Economics, Pullman, Washington. Stations Circular No. 191 (May 1952).

Hartson, Clive R., and Edwin C. Voorhies. Trade in Western Livestock at Auctions; Analysis of Livestock Marketings. Washington Agricultural Experiment Station, Pullman, Washington, Bulletin 537 (June 1952).

Interstate Commerce Commission. Carload-Waybill Analyses, 1952. Statement No. 5143.

Johnson, Sherman E. Changes in American Farming. U. S. Department of Agriculture, Bureau of Agricultural Economics. Washington, D. C., Miscellaneous Publication No. 707 (December 1949).

Lee, Karl. Economies of Scale of Farming in the Southern San Joaquin Valley, California. U. S. Department of Agriculture, Bureau of Agricultural Economics (April 1946).

Limmer, Ezekiel. Transportation of Selected Agricultural Commodities to Leading Markets by Rail and Motor Truck, 1930-50. P. 35, Table 24. Bureau of Agricultural Economics, Washington, D. C. (June 1951).

Lumbra, T. G. Truck Transportation of Perishables. Refrigeration Engineering, LIX (1951).

MacConnell, James D. and W. R. Odell. Moses Lake A New Frontier. Stanford University (December 1952).

Market Administrator's Office. Statistical Information for the Puget Sound-Washington Marketing Area. Seattle, Washington (August 1953).

Marts, M. E. An Experiment in the Measurement of the Indirect Benefits of Irrigation. Payette, Idaho. U. S. Department of Interior, Bureau of Reclamation. Boise, Idaho (1950).

National Association of Frozen Packers. Frozen Food Pack Statistics: 1952, Part 2 - Vegetables. Washington, D. C. (April 1953).

Northwest Wheat Research Project. Pacific Northwest Wheat Market Summary. Portland, Oregon (November 1953).

_____. Wheat Exports from the Pacific Northwest. Portland, Oregon (August 1950).

Oberg, Stanley M. Industrial Potentialities of the Columbia Basin, A Survey of Grant County, Washington. University of Washington Press for the Bureau of Business Research, College of Business Administration, University of Washington, Seattle (July 1950).

Pacific Northwest Grain and Grain Products Association. Revision of Freight Rates Upon Grain and Grain Products. Portland, Oregon (October 6, 1953).

_____. Report Covering a Survey on the Matter of Rates and Movement of Grain and Grain Products Within and From the Pacific Northwest to All Consuming Markets. Portland, Oregon (September 18, 1952).

Paulus, Robert C. An address on behalf of the Northwest Canners Association presented September 30, 1952 at a meeting of the Pacific Northwest Trade Association. Yakima, Washington.

Portland Freight Traffic Association. Memorandum on Freight Rate Savings Due to Commercial Navigation on the Columbia River. Portland, Oregon (August 17, 1953).

The President's Materials Policy Commission. Resources for Freedom. Vol. V (June 1952)

The President's Water Resources Policy Commission. A Water Policy for the American People. Vol. I, II, and III. Washington, D. C. (1950).

Public Utility District No. 2 of Grant County. The Pacific Northwest as a Market Area. Ephrata, Washington.

Pubols, Ben H. Prospective Farming on the Columbia Basin Irrigation Project. State College Agricultural Experiment Station, Pullman, Washington. Bulletin No. 456 (January 1945).

Purcell, J. C. and V. J. Brensike. Net Marketing and Slaughter of Livestock and Consumption of Meat by Regions, 1950. U. S. Department of Agriculture, Bureau of Agricultural Economics. Unpublished manuscript (1951).

Refrigeration Engineering. (January 1953).

Rowe, Gordon A. Economics of Cheese Manufacturing in Tillamook County, Oregon. State College Agricultural Experiment Station. Corvallis, Oregon. Bulletin 529 (December 1952).

Sacramento Cannels Unit, Sacramento River Division, Central Valley Project, California. Report submitted to Commissioner, Bureau of Reclamation (December 1952).

San Francisco Bay Ports Commission. A Report on Pacific Coastwise Shipping With Special Reference to the San Francisco Bay Ports Area. p. 21. (June 1953).

Schmid, Calvin F., Vincent A. Miller, and Warren E. Kalbach. Population Forecasts, State of Washington 1950-1960. Methodological Summary. Seattle, Washington.

Selby, H. E., and Donald T. Griffith. Livestock Production in Relation to Land Use and Irrigation in the Eleven Western States. U. S. Department of Agriculture, Bureau of Agricultural Economics. Berkeley, California (1946).

Senate Document 36, U. S. Senate, 76th Congress, 1st Session. National Irrigation Policy--Its Development and Significance.

Shepherd, Geoffrey. Changes in the Demand for Meat and Dairy Products in The United States Since 1910. Iowa State College of Agriculture, Ames, Iowa. Bulletin 368 (November 1949).

Stanberry, V. B., U. S. Department of Commerce, Bureau of Foreign and Domestic Service. Population Projects for the Pacific Northwest States and Region, 1960 and 1975. Prepared by Subcommittee on Comprehensive Program of Columbia Basin Inter-Agency Committee (June 1952).

Stanberry, V. B. Changing Character of the Pacific Northwest Population. A Report to the Columbia Basin Inter-Agency Committee. U. S. Department of Commerce (January 1953).

Stanberry, V. B., U. S. Department of Commerce, Office of Field Service. Population Growth in the Pacific Northwest, 1940-1950. Submitted to Columbia Basin Inter-Agency Committee, Portland, Oregon (September 13, 1950).

_____. Projections of Rual Farm Population and Agricultural Employment in Washington, Oregon, and Idaho, 1960 and 1975. Report to Columbia Basin Inter-Agency Committee (May 1953).

State of California Water Project Authority. Feasibility of State Ownership and Operation of the Central Valley Project of California. Sacramento, California (March 1952).

State Water Resources Board. Water Resources of California. Bulletin No. 1. Sacramento, California (1951).

Stevens, I. M., R. T. Burdick, H. G. Mason, and H. P. Gazeway. Marketing Western Feeder Cattle. Wyoming Agricultural Experiment Station. Laramie Bulletin 317 (June 1952).

Taggart, W. E. and John Morgan, Bureau of Reclamation, Region 2. Unpublished report. Sacreamento, California.

Taylor, C. W., Director of Bureau of Service, Interstate Commerce Commission. An address given before the United Fresh Fruit and Vegetable Association. Chicago, Illinois (February 1-4).

Tucker, Henry. Marketing Cattle and Calves Through the Spokane Stockyards. Washington College Agricultural Experimental Station. Bulletin No. 196 (January 1950).

_____. Marketing Hogs and Sheep Through the Spokane Stockyards. Washington College Agricultural Experimental Station. Bulletin No. 197 (February 1950).

U. S. Department of Agriculture. Agricultural Statistics 1952. (October 1953).

_____. Grain Stocks Report. Portland, Oregon.

_____. Irrigation Agriculture in the West. Miscellaneous Publication No. 670.

_____. Major Uses of Land in the United States. Technical Bulletin 1082 (October 1953).

_____. Technology in Food Marketing. Agricultural Monograph 14. (October 1952).

_____. Bureau of Agricultural Economics. Agricultural Estimates, Pacific Northwest Project Study. In cooperation with the Oregon Wheat Commission and Washington State Department of Agriculture. Portland, Oregon.

_____. Agricultures Capacity to Produce, Possibilities Under Specified Conditions. Agricultural Information Bulletin No. 88. (June 1952).

_____. Changes in the Dairy Industry United States, 1920-50. (1950).

_____. Chief Factors Underlying General Changes in Rail Freight Rates, With Special Reference to Farm Products, 1910-51. (May 1951).

_____. Consumption of Food in the United States 1909-48. Miscellaneous Publication. No. 691. Washington, D. C. (August 1949).

_____. Crop Production. (October 1, 1953).

_____. Crop Production Practices, Labor, Power, and Materials by Operation, Mountain and Pacific States. F. M. 92 Section 5 (March 1953).

_____. (H. C. Kriesel). The Dairy Situation. Washington, D. C. (September-October 1953).

_____. Effect on Increases in Freight Rates on Agricultural Products. Circular 847 (April 1950).

_____. Farm Production, Disposition, and Income From Milk, 1951-52. p. 12. (April 1953).

_____. Farm Production, Disposition, and Income, Meat Animals, 1951-1952.

_____. Farm Production Practices Costs and Returns. State Bulletin No. 83. Washington 25, D. C. (October 1949).

_____. The Federal Excise Tax on the Transportation of Property With Special Reference to Agriculture. (June 1949).

_____. Generalized Types of Farming in the United States. Agricultural Information Bulletin No. 3. Washington, D. C. (February 1950).

_____. Index Numbers of Railroad Freight Rates on Livestock and Meats, 1940-50. (November 1951).

_____. Interstate Barriers to Truck Transporation. (December 1950).

_____. Inventory of Major Land Uses in the United States. Miscellaneous Publication No. 663, Washington, D. C.

_____. Livestock Market News Statistics, 1952.

_____. The National Food Situation. October-December 1953.

_____. Production of Manufactured Dairy Products, 1949.

_____. Livestock Slaughter, by States.

_____. Pacific Northwest Wheat Market Summary. (November 1953).

_____. Pattern of Distribution of Fruits and Vegetables Shipped by Railroad, 1939 and 1947 and Transportation Charges 1947. (October 1950).

_____. Pattern of Distribution of Livestock, Meat, and Products Shipped by Railroad, 1939, 1948 and 1949, and Transportation Charges, 1948 and 1949. Washington, D. C. (October 1951).

_____. Shifts in the Trade in Western Slaughter Livestock by Western Livestock Marketing Research Technical Committee. AIB No. 14 (1950).

_____. Transportation of Selected Agricultural Commodities to Leading Markets by Rail and Motor Truck, 1939-50. (June 1951).

_____. Trucks Haul Increased Share of Fruit and Vegetable Traffic. Selected Fresh Fruits and Vegetables 1948-1951. Washington, D. C. (April 1953).

_____. Wheat and Flour Exports 1922-1949 From the Pacific Northwest. (August 1950 and supplements for 1951, 1952, and 1953).

_____. Production and Marketing Administration. Annual Summary of Grain Inspections. Portland, Oregon.

_____. A Study of Conditions Affecting the Transportation of Grains by Railroad. Washington, D. C. (June 1953).

_____. Dairy and Poultry Market Statistics. Washington, D. C. (1948-1952).

_____. Pacific Northwest Wheat Market Summary. Portland, Oregon (November 1953).

_____. The Transportation and Handling of Grain by Motor Truck in the Southwest. Washington, D. C. (1952).

_____. Unloads of Fresh Fruits and Vegetables. Washington, D. C. (1952).

U. S. Department of Army, Corps of Engineers. Review Report on Columbia River and Tributaries, Appendix N, Power Markets and Developments in the Pacific Northwest, Parts 1, 2, 3, and 4. (October 1, 1948).

_____. Review Report on Columbia River and Tributaries, Appendix S, Federal Power Commission Review of Power Market Study. (October 1, 1948).

U. S. Department of Commerce. Agricultural Programs of the United States, Current and Prospective. A Report to the Food and Agriculture Organization of the United Nations. (November 1952).

_____. Bureau of Census. Census of Agriculture, 1940 and 1950.

_____. Department of Agriculture, Bureau of Agricultural Economics. Revised Estimates of the Farm Population of the United States 1910 to 1950. BAE No. 16 (March 1953).

_____. Estimated Population of the United States, by States: 1910 to 1944. Series P-45, No. 9 (October 1, 1945).

_____. Estimates of the Population of States: July 1, 1940 to 1949. Series P-25, No. 72 (May 1953).

_____. Estimates of the Population of States: July 1, 1950 to 1952. Series P-25, No. 84 (November 24, 1953).

_____. Bureau of Public Roads. Highway Statistics. Yearly.

_____. State Motor-Vehicle Registrations 1951. Table MV-1, May 1952.

_____. Survey of Current Business, August 1953. "Income Payments to Individuals by States, 1929-1952".

U. S. Department of Interior. Annual Report of the Secretary of the Interior. Fiscal year ending June 30, 1952. Bureau of Reclamation Report. Washington, D. C.

_____. Bureau of Reclamation. 1951 Crop Summary and Related Data, Federal Reclamation Projects. Washington, D. C. (August 1952).

_____. Bonneville Power Administration. Estimated Potential Electric Power Requirements of the Snake Basin Area. Portland, Oregon (January 1952).

_____. U. S. Columbia River Power System. Portland, Oregon (January 1953).

_____. Bureau of Reclamation. Based on Grant County 1925-57 and Mature Development. Ephrata, Washington.

______. Bureau of Reclamation, Economics Branch. Report of October 1952. Ephrata, Washington.

______. Bureau of Reclamation, Economics Branch. Report of June 1953. Ephrata, Washington.

______. Bureau of Reclamation, Columbia Basin Joint Investigations. Development Rate of Project Lands, Problem 17. Washington, D. C., (1945).

______. Bureau of Reclamation, Columbia Basin Joint Investigations. Character and Scope. Washington, D. C., (1941).

______. Bureau of Reclamation, Columbia Basin Joint Investigations. Highway Development, Problem 19. (1945).

______. Bureau of Reclamation, Columbia Basin Joint Investigations. Markets and New Lands. Washington, D. C., (June 1942).

______. Bureau of Reclamation, Columbia Basin Joint Investigations. River Transportation, Problem 21. (1945).

______. Bureau of Reclamation. Fifty Years of Reclamation. Financial Report to the Nation's Stockholders 1902-1952. Washington, D. C., (September 1952).

______. Bureau of Reclamation, Region 1. An Experiment in the Measurement of the Indirect Benefits of Irrigation--Payette, Idaho. Boise, Idaho, (June 1950).

______. Bureau of Reclamation, Region 1. Farm Development and Ground Water Supply--1950 Season. Northside Pumping Division, Minidoka Project, Rupert, Idaho, (October 1, 1951).

______. Bureau of Reclamation, Region 1. Farm Development and Ground Water Supply--1951 Season. Northside Pumping Division, Minidoka Project. Rupert, Idaho, (November 1952).

______. Bureau of Reclamation, Economics Branch. Indications of Business and Industrial Development That Will Result from the Irrigation of the Columbia Basin Project. Ephrata, Washington, (January 1953).

______. Bureau of Reclamation, Region 3. Major Irrigation Developments in Region 3. Boulder City, Nevada, (November 1951).

______. Bureau of Reclamation, Region 1. Minidoka Project, Northside Pumping Division, Idaho, Project Planning Report No. 1-5. 53. 1-1. Boise, Idaho, (April 1949).

_____. Bureau of Reclamation, Region 2. Long-Term Water Requirements--California. Sacramento, California, (October 1948, Revised May 1951).

_____. Bureau of Reclamation. Opportunities, Responsibilities, and Needs in Irrigation Development. Columbia Basin Project, Development Report No. 2. Ephrata, Washington, (February 1949).

_____. Bureau of Reclamation, Region 1. Palisades Dam and Reservoir Project--Idaho. Allocation and Repayment of Costs. Boise, Idaho, (June 1949).

_____. Bureau of Reclamation. Report on Tentative Population Forecasts for the Columbia Basin Project Area, 1960 and 1980. Ephrata, Washington, (June 1953).

_____. Bureau of Reclamation. The Reclamation Program, 1948-1954. Washington, D. C., (December, 1947).

_____. Bureau of Reclamation. Sacramento Canals Unit, Sacramento River Division, Central Valley Project, California. Report submitted to Commissioner. Sacramento, California, (December 1952).

_____. Bureau of Reclamation, Senate Document, 81st Congress, 1st Session. Columbia River Basin--A Comprehensive Departmental Report. (1949).

_____. Bureau of Reclamation, Senate Resolution 102, 78th Congress. Hearings Before the Special Committee on Postwar Economic Policy and Planning, Part 5. Reclamation, Irrigation, and Power Projects, Washington, D. C., (1944).

_____. Bureau of Reclamation, Senate Document 113, 81st Congress, 1st Session. Central Valley Basin--A Comprehensive Departmental Report. (August 1949).

_____. Bureau of Reclamation. A Study of Future Power Transmission for the West. Washington, D. C., (1952).

_____. Bureau of Reclamation, Types of Farming, Columbia Basin Joint Investigation Problem. Washington, D. C., (1945).

_____. Bureau of Reclamation, Region 3. Yuma Project. Washington, D. C., (February 1950).

_____. Columbia Basin Joint Investigations. Agricultural Processing Industries, Problem 24. (1945).

U. S. Interstate Commerce Commission, Bureau of Transport Economics and Statistics, "Statistics of Railways in the United States," (1951).

University of Arizona, Agricultural Experiment Station. A Summary of Laws Relating to the Interstate Movement of Agricultural Products in the Eleven Western States. Tucson, Report No. 109, (May 1952).

Walker, Scott H., Homer J. Preston, and Glen T. Nelson, An Economic Analysis of Butter-Nonfat Dry Milk Plants, Research Bulletin No. 20, Western Regional Research Publication Regional-Dairy Marketing Report, University of Idaho Agricultural Experiment Station, (June 1953).

Washington Agricultural Experiment Stations, Circular No. 146; Division of Industrial Research, Bulletin No. 213. A Report to Trans-Northwest Gas, Inc., Estimated Fuel Requirements for the Potential Processing of Agricultural Products of the Columbia Basin Irrigation Project. State College of Washington, Pullman, Washington, (June 12, 1951).